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ABSTRACT

Presented are 26 papers and four Association reports given at the 1970 national conference. Among the papers are the following titles: "Educating the Multihandicapped Blind Child", "Regional Centers for Deaf-Blind Children--A New Hope", "The Multiply Impaired Visually Handicapped in the Residential School", "The Multiply-Impaired Visually-Handicapped in the Day School", "Cooperative Work-Study Program for the Visually Handicapped", "Mobility for Young Blind Children", "The Perceptual Basis for Mobility", "Pioneering with Time-Sharing Computer Service at Perkins School for the Blind", "Emotional Distrubance & Sensory Deprivation--A Possible Relationship", "The Sexual & Social Adjustment of Visually Handicapped Adolescents--A Longitudinal Approach", "Cognitive Patterns in Subjects Blinded by Retinoblastoma", "Technological Advances in Sensory Aids for the Blind at Massachusetts Institute of Technology", "Preschool Vision & Hearning Screening & Nursery School Programs for Visually Handicapped Children", and "Implications for Guidance Counselors and Principals of Research on the Vocational Success of the Visually Handicapped". Among Association reports and business also included are the President's Report, the Braille Authority Report of 1970, and Amendments to the Constitution and By-Laws. (DB)

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Selected Papers

Association For Education of the Visually Handicapped

Fiftieth Biennial Conference

"A Look at the Child"

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION
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June — July 1970
New Orleans, Louisiana

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Association for Education of the Visually Handicapped

1604 Spruce Street
Philadelphia, Pennsylvania 19103

ASSOCIATION FOR EDUCATION
OF THE VISUALLY HANDICAPPED

Known first as the Instructors of the Blind, and later incorporated as the American Association of Instructors of the Blind, AEVH began in 1853 with a national meeting of superintendents of sixteen residential schools for the blind. Except for a few years when national emergencies prevented, conventions have been held biennially since that time. At the 1968 convention, the name of the organization was changed to Association for Education of the Visually Handicapped.

In 1952 the Workshop method of national conferences was adopted and membership was broadened to include all who were interested in improving the educational opportunities of visually handicapped children. In the Workshops, educators are able to define problems and work actively toward their solutions. Under the leadership of their own elected officers, workshops may continue in common efforts between national conventions, often producing newsletters or taking action at regional meetings. Student chapters have now been formed at several universities and a move toward state chapters is also in progress.

AEVH publishes a newsletter called the FOUNTAINHEAD, a volume of selected papers from its biennial conference, and provides the professional journal, EDUCATION OF THE VISUALLY HANDICAPPED, for its members. The organization also participates actively in teacher and houseparent certification, training institutes, the development of special standards, the encouragement and report of research in the field, and cooperation with national and international agencies and organizations interested in the education of visually handicapped children and youth.

AEVH is affiliated with The Council for Exceptional Children, a Department of the National Education Association.

For further information, write AEVH Executive Secretary, 1604 Spruce Street, Philadelphia, Pennsylvania 19103.

MEETINGS

The following is a list of the conventions of the American Instructors of the Blind (1853-1871), the American Association of Instructors of the Blind (1872-1968), and the Association for Education of the Visually Handicapped (1968-1970):

1st Meeting:	August 16-18, 1853 at New York, New York
2nd Meeting:	August 8-10, 1871 at Indianapolis, Indiana
3rd Meeting:	August 20-22, 1872 at Boston, Massachusetts
4th Meeting:	August 18-20, 1874 at Batavia, New York
5th Meeting:	August 15-17, 1876 at Philadelphia, Pennsylvania
6th Meeting:	August 21-23, 1878 at Columbus, Ohio
7th Meeting:	August 17-19, 1880 at Louisville, Kentucky
8th Meeting:	August 15-17, 1882 at Janesville, Wisconsin
9th Meeting:	August 19-21, 1884 at St. Louis, Missouri
10th Meeting:	July 6-8, 1886 at New York, New York
11th Meeting:	July 10-12, 1888 at Baltimore, Maryland
12th Meeting:	July 15-17, 1890 at Jacksonville, Illinois
13th Meeting:	July 5-7, 1892 at Brantford, Ontario, Canada
14th Meeting:	July 17-19, 1894 at Chautauqua, New York
15th Meeting:	July 14-16, 1896 at Pittsburgh, Pennsylvania
16th Meeting:	July 12-14, 1898 at Lansing, Michigan
17th Meeting:	July 9-11, 1902 at Raleigh, North Carolina
18th Meeting:	July 20-22, 1904 at St. Louis, Missouri
19th Meeting:	August 21-23, 1906 at Portland, Oregon, at Salem, Oregon, and at Vancouver, Washington
20th Meeting:	July 14-16, 1908 at Indianapolis, Indiana
21st Meeting:	June 28-July 1, 1910 at Little Rock, Arkansas
22nd Meeting:	June 25-28, 1912 at Pittsburgh, Pennsylvania
23rd Meeting:	June 28-30, 1915 at Berkeley, California
24th Meeting:	June 4-7, 1916 at Halifax, Nova Scotia, Canada
25th Meeting:	June 24-28, 1918 at Colorado Springs, Colorado
26th Meeting:	June 21-25, 1920 at Overlea, Maryland
27th Meeting:	June 27-30, 1922 at Austin, Texas
28th Meeting:	June 23-27, 1924 at Watertown, Massachusetts
29th Meeting:	June 21-25, 1926 at Nashville, Tennessee
30th Meeting:	June 25-29, 1928 at Faribault, Minnesota

31st Meeting:	June 23-27, 1930 at Vancouver, Washington
32nd Meeting:	June 27-July 1, 1932 at New York, New York
33rd Meeting:	June 25-28, 1934 at St. Louis, Missouri
34th Meeting:	June 22-25, 1936 at Raleigh, North Carolina
35th Meeting:	June 27-30, 1938 at Lansing, Michigan
36th Meeting:	June 24-28, 1940 at Pittsburgh, Pennsylvania
37th Meeting:	June 26-30, 1944 at Little Rock, Arkansas
38th Meeting:	June 24-28, 1946 at Watertown, Massachusetts
39th Meeting:	June 21-25, 1948 at Austin, Texas
40th Meeting:	June 26-30, 1950 at Philadelphia, Pennsylvania
41st Meeting:	June 29-July 3, 1952 at Louisville, Kentucky
42nd Meeting:	June 27-July 1, 1954 at Batavia, New York
43rd Meeting:	June 24-28, 1957 at Worthington, Columbus, Ohio
44th Meeting:	June 22-26, 1958 at Vancouver, Washington
45th Meeting:	June 26-30, 1960 at Donelson, Tennessee
46th Meeting:	June 28-July 2, 1962 at Miami Beach, Florida
47th Meeting:	June 21-25, 1964 at Watertown, Massachusetts
48th Meeting:	June 26-30, 1966 at Salt Lake City, Utah
49th Meeting:	June 23-27, 1968 at Toronto, Ontario, Canada
50th Meeting:	June 28-July 2, 1970 at New Orleans, Louisiana

Copies of convention proceedings or selected papers for many of the above meetings may be purchased by inquiry to the office of the Association for Education of the Visually Handicapped, 1604 Spruce Street, Philadelphia, Pennsylvania, 19103.

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EDUCATING THE MULTIHANDICAPPED BLIND CHILD

Josephine L. Taylor, Coordinator

Units on the Visually Handicapped,
Multihandicapped, and Interrelated Areas
Division of Training Programs
Bureau of Education for the Handicapped
United States Office of Education
Washington, D.C.

I should like to congratulate the Program Committee on their selection of the theme of the multihandicapped child for this biennial convention. The committee's action coupled with a review of the literature in our professional journals and publications during the past several years and the audience meeting here today exemplifies the recognition of the leadership on special education that the best possible educational opportunities should be made availabie for all handicapped children.

I doubt that any other professional organization has devoted its entire convention to this crucial and very difficult problem. Education of the multihandicapped is not new to those concerned with visually handicapped children. We are familiar with the dramatic story of the education of Laura Bridgeman who entered Perkins Institute for the Blind in 1837 and became the first deaf-blind child to be educated. We are far from reaching the goal of providing an appropriate education for the many children who have handicaps in addition to serious visual impairment. However, some rather dramatic developments in responding to the needs of the multihandicapped are evident in various parts of the country.

Although it is generally recognized that there has been an increase in the incidence of multihandicapped children we have only a rough estimate of how many there are, despite some extensive surveys, notably the one sponsored by the American Foundation for the Blind, and the one performed by Dr. Berthold

Lowenfeld for the California State Department of Education. The results of both of these have been published by the American Foundation for the Blind, an organization that has contributed much to our understanding of the problems in this field through its research and publications. Among these publications is the study of the *Blind Child with Concommitant Disabilities* by Dr. James M. Wolfe. Dr. Wolfe is co-editor and compiler with Dr. Robert M. Anderson of a recent publication of Charles C Thomas Company, entitled the *Multiply Handicapped Child,* which includes contributions of over 30 persons who have a strong concern for multihandicapped children.

One reason we do not know how many multihandicapped children there are is that these investigations were made prior to the impact of the rubella epidemic of 1964-1965. Even today, as the children with resultant congenital anomalies are beginning to reach school age, we do not know how many there are, and what their handicaps are, but we do know that this epidemic greatly increased the numbers and that future rubella epidemics may add many more, unless there is a step-up in the availability and use of the rubella vaccine.

Prevalence studies, as well as most legislation and determination of funding resources, have been based upon medical categories for determining the additional handicaps and limited to the industrial definition of blindness for the visual handicap.

Educators reached a stage of sophistication long ago in which they recognized that medical diagnoses, or figures that indicate visual acuity, decimal loss or, for that matter, IQ, are of limited value in determining a child's educational needs, or his emotional or social adjustment, or the service requirements of his parents. It is imperative that each child have a thorough physical examination, and that all possible means be applied to bring him to the optimum of physical and mental health. This is a basic right of all children, but any program purporting to serve handicapped children, that does not make provision for this throughout the child's school life does not have a sound foundation. It is the continuing psycho-educational evaluation that will determine whether or not a child is multihandicapped, or for that matter whether he is handicapped, in terms of school programs. The children about whom we should be concerned during this convention might be described as follows:

"Those who, in addition to a visual impairment, have at least one other disability regardless of the extent of either, the combination of which causes such severe educational problems that they cannot receive adequate services in educational programs for visually handicapped children or in those established for other handicapped children."

Some of you will note that this definition has been borrowed from the definition of deaf-blind children used by the Bureau of Education for the Handicapped. I feel quite comfortable with this definition because I assumed a major responsibility in writing and in shepherding it through the legal procedure to authorize its use. The general concept had long been in practice, and is very similar to the definition used by the National Committee on the Education of the Deaf-Blind.

I present this definition in the hope that it will help with communication. We are here as educators interested in knowing what in the broadest sense, the education problems are, in order that we may plan for the future. This definition may also help distinguish between handicapping conditions and educational inconveniences on the basis of whether the child can receive an adequate education. Under this definition a totally blind child on crutches or in a wheelchair, would not be considered multi-handicapped unless the psycho-educational evaluation brought out other problems in learning which could not be appropriately provided in the program for the visually handicapped, or in a program for the orthopedically handicapped. It may be inconvenient to build a ramp, and a bit expensive to buy a one-hand brailler or to adapt a typing program, but it is possible, and has been done for many years. If the child needs physical therapy this of course should be provided by the appropriate medically oriented professional personnel. On the other hand, if whatever caused the orthopedic handicap also caused an additional learning problem, as is sometimes the case in cerebral palsy, it may not be possible for either the program for the visually Handicapped or the orthopedically handicapped, to provide an adequate education. Such a child would be considered multihandicapped.

The decision on who is multihandicapped would be based upon psycho-educational evaluation of the child's educational problems. There are numerous examples of children who have more than one physical or mental disability, but who are able to receive an adequate education among children who do not have a handicap, or

in programs for a particular type of handicap. Here are a few examples: the child with a cardiac condition, or some other problem that prevents him from participating in rugged sports, but who nevertheless can carry on a normal educational program; the child with a mild speech defect which requires therapy but does not interfere with his educational program; the mildly hard-of-hearing child who may be able to participate well in all classroom activities provided a slight adjustment is made to be sure he is seated where he can hear what is going on; or the partially seeing child, who although he may have a severe additional handicap, can be accommodated in the regular educational program adapted for the more severely handicapped. If we consider the multihandicapped child to be the one whose additional disability is of such a nature that he cannot receive an adequate education, even with adjustments within the regular classroom, or a classroom for children with a simple handicap, we may find that there are not as many multihandicapped children as some of the investigations have indicated. We will know for certain how many there are, who they are, and where they are only when they have had a thorough physical examination and treatment for improvement of their handicaps plus a thorough psycho-educational evaluation to determine what type of individual educational planning is necessary for them. As educators and psychologists sharpen their diagnostic skills and their ability to communicate more effectively, it is possible that we may find that there are children who have not previously been so considered, who really are multihandicapped from an educational standpoint. These might include children with specific learning disabilities including something so basic as insufficient tactile discrimination or children considered retarded who actually have greater potential than previously assumed, provided the teacher is trained to make the necessary adaptations in a child's educational program.

Although the diagnostic and evaluation team approach has been used extensively -- a new team teaching diagnostic system has developed through which the findings of the psychologist, social worker, physician, and others are brought together to make an educational diagnosis of the child's learning problems. A program is "prescribed" for the child by each member of the teaching team according to his area of specialization. In a special project directed by Dr. Verna Hart at George Peabody College for Teachers, the development of a team teaching practicum, as the basic element in a training program for teachers of multihandicapped children, is being watched with great interest. Out of

this project and out of another, a research project co-directed by Eileen Jackson and Philip Hatlen of San Francisco State College, there will also be developed techniques for measuring changes in behavior as a result of professional help and some detailed descriptions of teaching strategies and curriculum for multihandicapped children on the early childhood level.

Perkins School for the Blind, long time leader in educating the deaf-blind, is also using the diagnostic teacher approach and apparently has found a successful means of helping to resolve the problem of providing individual attention for children despite the shortage of trained personnel in the area of the deaf-blind. Assistant teachers are employed to work under the direction of those who have had professional training. Frequently, a recruitment bonus occurs at the close of the year of individual internship, when the assistant teacher decides to enter the graduate program for professional preparation of teachers of the deaf-blind.

Another interesting variation in services to children combined with teacher training programs is practiced at Michigan State University, and the Deaf-Blind Department of the Michigan School for the Blind. Here undergraduate teacher training program students, after completing most of the required academic training, spend a full year as paid interns at the School for the Blind. A supervisor of interns gives full time to no more than five trainees. The concept of an individualized internship is not new. In the proceedings of the 1936 convention of this organization, you you will find an article by Frank Andrews, in which he describes a program through which a teacher from another school would come to Perkins with the deaf-blind child from that state, study for a year, and then return to the school with the child. During that year Miss Hall, the first director of the Deaf-Blind Department at Perkins, would train the teacher so that she could carry on with the child when she returned to her home state. Most programs in other schools for the blind were developed by teachers who had received this type of tutorial internship.

Andrews also wrote in 1936 of another concept which I will quote here not because it is a current trend, but because it would seem to have good possibilities for consideration in the regional center plan which includes cooperation of teacher training institutions and development of local facilities. Andrews stated that, "Another interesting development of this work is Dr. Farrell's desire to give people training in this field. We have

hired an exchange teacher. This teacher is available to any school which has a deaf-blind child and which needs a teacher to educate him. The school chooses a teacher and sends her to us for training, while our exchange instructor carries on with the child until his regular teacher returns from the training period."

Probably the most dramatic change has been the rapid increase in the number of classes for multihandicapped children. Much of this has come about through the availability of funds from the United States Office of Education under the amendment to Title I of the Elementary and Secondary Education act, Public Law 89-313 and through Title VI-A of that act. In reviewing the list of projects under this legislation, we find numerous institutions for the retarded have developed classes for their visually handicapped children. In a number of instances the employment of trained teachers of the visually handicapped is included. Now, most but not all, residential schools have developed special classes for multihandicapped, including very severely multihandicapped children. Most larger city school systems have special classes of this type and there have also been developments for multihandicapped children in some smaller districts and in regional centers. Teacher training programs provide practicum experience in classes for the multihandicapped. Small private schools, some of which were formerly nursery schools in private and public agencies and clinics continue to carry a share of the responsibility. Each year we see an increased "working together." Some residential schools provide diagnostic services for children who attend local schools or institutions or are still at home without a placement. Summer programs for children are offered by residential schools, agencies and a few local schools in the community. Some include children who are not part of their regular academic-year student body.

The regional planning and programming concept of the Centers for the Deaf-Blind children seems to have survived the birth trauma, but continues to have many growing pains. I personally believe that this concept of regional coordination of services is the bright star of our future ability to meet the problems of providing adequate educational services to visually handicapped children including those who have additional educational problems. We have come a long way in developing new programs, and we are making strides in our ability to evaluate what we are doing in services to children, and in training personnel. We

are also upgrading our services through the development of instructional material centers and special projects, such as the one in Texas for developing a sequential series of educational materials and through a variety of special study institutes.

However, when I look at the map of the United States and see over 500 different school programs for visually handicapped children scattered over it, ranging in enrollment from four to over a thousand, I am concerned. If several states can work together to provide adequate services for deaf-blind children perhaps they can also work together to provide adequate services for other types of multihandicapped children with other educational problems.

In this respect, I am particularly concerned about the average, or above average visually handicapped child, who does not appear to have additional educational handicaps. Among those at the early childhood level there seems to be an increased number blinded from retinoblastoma or from congential glaucoma, neither of which are usually accompanied by additional handicaps. Many of these children have above-average potential. The idea that all of these children might live at home, attend their neighborhood schools and have itinerant teachers is not realistic. There are many parts of our country that do not have adequate local school programs for visually handicapped children. Also there are many parts of our country that probably can never have adequate programs because of the paucity of population in a given area. Moreover, even if we extend and improve our parent counseling skills, there will probably always be some parents who are unable to provide a healthy, stimulating environment for their visually handicapped children. Perhaps we have reached a level of maturity at which we can give up the little red school house for visually handicapped children, and begin thinking in terms of consolidated programs -- stretching, if necessary, across state lines not only for the multihandicapped, but also for the not-to-be-forgotten visually handicapped child, who does not have severe additional learning problems.

It seems probable that a change in funding patterns will be necessary to accomplish any type of regionalized educational services for visually handicapped children, including the multihandicapped. The Bureau of Education for the Handicapped has recognized that areas of handicapping conditions in which there is a low prevalence need special consideration. The Deaf-Blind Centers program is one of the prime examples of this thinking. Likewise, in determining the distribution of funds for the

training of professional personnel among the various handicapped categories, special consideration is given to those of low-prevalence, including of course the multihandicapped and the visually handicapped.

These special considerations could suggest that multihandicapped children and others in low-prevalence categories such as those who are blind, or cerebral palsied or deaf, should not be denied a high quality education because they happen to live in a sparsely settled geographical location. It seems probable that the highly individualized and intensive training required for children with these special educational problems is so costly that even with regionalized services, much greater federal funding will be required if equality of education is to be achieved. The crisis in providing adequate educational services to deaf-blind children is so acute that Dr. Edwin Martin, Associate Commissioner, has indicated that the Bureau of Education for the Handicapped will focus its efforts on behalf of this particular group of children even more extensively in the immediate future.

In the meantime we, as educators of visually handicapped children, need to develop our understanding of the educational needs of multihandicapped children, to plan together and, to:

I. Recognized that the sum of knowledge of two or more handicaps does not add up to an understanding of the needs of a child who happens to have these problems. Consideration must be given to the total effect of two or more handicapping conditions upon that particular individual child, and an understanding of his resultant unique learning problem.

II. Become more flexible in our approach to children and not become frustrated or discouraged because some cannot use the tools with which we feel comfortable. For instance, we need to recognize that if a child cannot read print or braille it does not mean that he cannot learn aurally. This does not mean that he sits in a classroom where other children are reading and writing and gains what he can through listening. We need to develop a learning program for him, using to the utmost his particular abilities. We need to know a great deal more about teaching - "learning through listening" - and the development of listening skills.

III. We need to continue to concentrate on the development of efficient utilization of vision from light perception on up the scale.

IV. We need to develop better educational diagnostic techniques and teaching skills. We especially need to remember that learning is a very personal thing. Ours is the challenge to find each child's own way of learning and to plan a personal program through which he can develop his particular gifts.

MULTIPLY IMPAIRED CHILDREN: A NATIONAL STUDY

Milton D. Graham, Director
Department of Research

American Foundation for the Blind
New York, New York

ORIGINS OF THE STUDY

This study had its origin in the mounting concern, about 10 years ago, among pediatricians, pre-school specialists and others, that the number of multiply impaired children was increasing, due largely to two developments.

Advances in medical science had resulted in the saving of many more premature children than had been the case a decade before. Many of these premature children were considered "high risks" since they were subject to many impairments and conditions not associated with normal, full-term births. Some of these conditions were brain damage, visual impairment, hearing impairment, heart conditions and so on. Many prematures were found to have multiple conditions which earlier would have resulted in death.

This trend was dramatically brought to everyone's attention by the rubella epidemics of the mid-1960s, mainly on the East and West coasts. Some far-sighted educators (like Dr. Waterhouse of Perkins School for the Blind) began to try to anticipate what problems they would meet as these infants became pre-school children and eventually school children. In 1965 the AFB board of trustees authorized its Department of Research to undertake a survey of multiply impaired children. That study is the subject of this report.

We were fortunate enough to collect an excellent advisory committee and a first-rate full-time investigator, the then Miss Roseanne Kramer, now Mrs. Roseanne Kramer Silberman. We developed

a questionnaire, based largely on a previous study by Dr. James Wolf for his dissertation at the University of Pittsburgh.

Considering our modest budget, we determined with the help of our advisory committee, that personal interviews would be too costly and that a mail survey would probably obtain more information on more children than any other technique, despite the well-known short-comings of the mail survey approach.

We mailed questionnaires to some 1,063 addressees. The response was remarkable. All 50 states, Puerto Rico and the District of Columbia responded. Every kind of institution and organization was well represented by the replies: local day schools, residential schools for the blind, private and state institutions, state welfare and health organizations, state education departments, voluntary agencies for the blind, hospitals and clinics and so on. From these sources we found data on 8887 children usable for statistical analysis. With this number, we felt that it would be possible to generalize quite safely on selected topics.

The data are not foolproof nor definitive, but, in our language, descriptive. Mail surveys leave a lot to be desired. Who answers and who doesn't? Does everyone mean the same thing when they report a child as brain damaged or mentally retarded? Who filled out the questionnaires and with what help from what files or records? These are only a few of the questions that go unanswered on a mail survey. Then why do it? You can get *some* information about a large number of people with a modest expenditure of funds. And there are some safeguards and rules of thumb that all researchers respect. Here are some points that made us satisfied that the data were relatively reliable.

First, questionnaires were returned in 1966 and 1967 from all *kinds* of institutions and organizations, not just one or two kinds. Though coverage varied, all states reported. All age groups were adequately represented although the under 6 year olds were disappointingly low: 529 or 6 percent of the sample. Etiology of blindness followed known national estimates. Additional impairments to blindness were close to what experts had observed, as were reading grade levels and mobility performance. Our data, we felt, made sense and common sense.

FINDINGS

AGE: Of the 8887 children, 529 (6 percent) were under 6; 3834 (43 percent) were 6 to 12; 3072 (35 percent) were 13 to 16; and 1450 (16 percent) were 17 to 21.

AGE AT ONSET OF VISUAL IMPAIRMENT: 4,415 (50 percent) were visually impaired at birth; 2990 (34 percent) before age 3; and 581 (7 percent) after age 3. There were no data on the remaining 901.

ADDITIONAL DISABILITIES TO VISUAL IMPAIRMENT: Percentages of additional disabilities are:

	%		%
Mental retardation	80	Cerebral palsy	14
Speech problems	39	Epilepsy	14
Brain damage	35	Crippling-orthopedic	12
Emotional problems	17	Hearing	11
		Other	11

These data suggest two important facts: First, how very complex the problems of multiply impaired children are with so many severe impairments and conditions, and secondly, with 84 percent of this sample suffering severe visual impairment before age 3 there can be little or no visual memory so important to the perceptual and educational processes.

This in part may explain why half of the totally blind children in the sample (N=4309) are reported as non-readers. Only 15 percent are reported as having reading vision. Of the readers about one-quarter use braille and another quarter use large print or regular type as their principal mode of reading. Tapes and records seem very little used by this group. Add to this that 32 percent of the group are reported as below 50 IQ, 20 percent do not communicate through speech, and another 16 percent have defective speech, and the complexity of educating the group becomes very clear indeed.

These, then, are the principal highlights of the study of 8887 blind multiply impaired children. My principal conclusion to the study was in 1967, and would be now, that the severity of the problem could be attacked only through a national program of depth and ingenuity. Communities and parents could not afford

the cost and the elaborate new techniques that were clearly called for.

This conclusion seems to have been shared by others closer to the problems of the multiply impaired. Testimony before the U.S. Congress to this effect resulted in Public Law 90-247 signed by President Johnson on January 2, 1968. This was the "model centers for deaf-blind" bill which authorized a national effort which is now developing well.

FINDINGS ON 1045 DEAF-BLIND CHILDREN

Since deaf-blindness is one of the most severe of multiple impairments and some experience with this group has been gained over the years, additional details might be helpful on the 1045 deaf-blind children in the larger group. All age groups are represented.

AGE

Below 6	11 percent
6 - 12	46 percent
13 - 16	28 percent
17 - 21	15 percent

Twenty-four percent were reported as congenitally deaf and 63 percent were reported as hard-of-hearing. The remainder could not be reported for various reasons. Of the group of 1045 children about half were reported as totally blind. Of these 549 children, about one-third were reported as deaf, one-half as hard-of-hearing and the small remainder impossible to determine. Only 20 percent of the deaf were reported having reading vision while three-quarters of the hard-of hearing had some reading vision.

Besides the congenitally deaf-totally blind group, another group seems equally severely impaired. About one-half of the deaf are under age 6. These are probably largely rubella children. Another statistic of interest to educators, speech therapists and psychologists is that about one-quarter of the deaf group were deaf before age three.

To get some information in depth, 130 cases reported by 7 states were studied further. Over half of this group had conditions

additional to deaf-blindness. One-third were reported as mentally retarded, about one-third with serious speech problems, 13 percent with brain damage and so on. This is a truly severely multiply impaired group.

Of the 73 or slightly over half of the group reported as mentally retarded 40 percent were reported educable (50-90 IQ), 9 percent trainable (25-49 IQ) and 7 percent profoundly retarded with IQs below 25. Although three-quarters of the group is probably educable, their record is not prepossessing. The average grade attainment of the group of 130 is 3.1 grades while the average age is 12 years, quite a disparity. In this group, 20 percent are non-readers. Of the readers 39 percent use braille as their principal mode of reading, 48 percent use large type, 10 percent regular type, 13 percent use records and 6 percent tapes. (These add up to more than 100 percent since some reported two principal modes of reading.)

IMPLICATIONS

What do all these figures mean? I am not an educator but some of the implications for educating any multiply impaired group seem obvious enough. There are hard-core groups that will require every ounce of a teacher's ingenuity and patience to get through to: like the congenitally deaf and totally blind, like the congenitally blind and profoundly retarded, like the severely emotionally disturbed blind child, and so on. I am told that the challenge is great and so can be the rewards. Certainly teachers dealing with such intransigent problems deserve all the support they can get: special training courses and institutes where they can learn and share new techniques as well as comfort each other. Because of their particularly stressful job, they should be as free of administrative responsibility as possible. They should have the special equipment and supplies that they need. They should be given a fair chance to win.

One last thought occurs to me. The key figure, the anchor man so to speak, is the teacher but others are involved too, others that must function fully efficiently also if the job is to be done. The school psychologist must help determine the academic and personal potential of the student. A social worker must work with the parents and the teachers to remove all impediments to the human relationships involved. The medical personnel have all too obvious a responsibility in this team effort: the early

diagnosis, the treatment, the recurring examinations necessary to chart the development of a growing changing child. The list could go on.

As a research specialist, I can only hope that we will be called on to record and to help interpret the confusing, complex experience that comes with educating a multiply impaired child whose motivation, whose possibly damaged ego, and whose self-goals may be in question.

All these specialists must respect each others skills. The teacher should not be expected to be an ophthalmologist, nor an opthalmologist a social worker. Each has his own unique contribution to make. The severely multiply impaired need all the help that they can get. Traditional ways and techniques of dealing with them are going to have to give way to innovative and creative processes.

But perhaps the biggest obstacle to overcome is the feeling, however inarticulately expressed, that guiding multiply impaired children to a reasonably rewarding life is really too complicated, too risky, too expensive. The doubters should look to the work being done at Ann Arbor and the Oregon School for the Blind--to name only two--if they think that success isn't possible. They have shown what hard work, patience, dedication and faith can do. Let us all try to do as well.

REGIONAL CENTERS FOR DEAF-BLIND CHILDREN - A NEW HOPE

Robert Dantona, Coordinator

Services for Deaf-Blind Children
Projects Centers Branch
Department of Health, Education, and Welfare
Office of Education
Washington, D.C.

The rubella epidemic of 1964-65, as it swept across the nation, left a tragic toll upon an estimated 20,000 infants born with one or more of the following handicaps: cataracts, hearing defects, heart malformations, mental retardation, and brain damage. In addition, some 20,000 pregnancies were terminated in miscarriage or stillbirth.

The National Communicable Disease Center in its June, 1969 *Rubella Surveillance Report,* estimated the economic cost for the Nation's 20,000 children with congenital rubella syndrome for 1964-65, as $919,912,000. This includes the following: More than $28,000,000 in medical care, more than $48,000,000 for institutional care, and more than $742,000,000 in the area of special education.

Largely as a result of the 1964-65 epidemic and the perseverance of educators of deaf-blind children, Congress approved the Act, Public Law 90-247*, Part C, which amends Title VI of the Elementary and Secondary Education Act, to develop comprehensive Centers for deaf-blind children. President Johnson signed this Act on January 2, 1968 and in September of 1968, Congress

*As of April 13, 1970, Public Law 90-247, Part C, Title VI of the Elementary and Secondary Education Act is now Part C (Sec. 622) of Public Law 91-230, Title VI, the "Education of the Handicapped Act".

appropriated $1,000,000 for fiscal year 1969. By June 1, 1969 eight Regional Deaf-Blind Centers were funded at a cost of one million dollars. Three of these Centers were developmental in nature and planned during their first year to develop specific programs to meet the needs of deaf-blind children in their area. Five of the Centers were combined developmental/operational programs and were able to provide to some degree basic services for deaf-blind children.

In fiscal year 1970, two additional planning Centers were funded. The remaining eight Centers have all become developmental/operational and will soon begin their second year of activities. The ten Centers will now serve and plan for the needs of deaf-blind children in all 50 states. (See Appendix.)

I. The Deaf-Blind Center Concept

It is the intent of Congress, under this Act (P.L. 90-247), that the Deaf-Blind Center programs be

> "...designed to develop and bring to bear upon such children beginning as early as feasible in life, those specialized, intensive professional and allied services, methods, and aids that are found to be most effective to enable them to achieve their full potential for communication with and adjustment to the world around them, for useful and meaningful participation in society, and for self-fulfillment."

The "deaf-blind child" who will be the concern of our Center programs is defined as a child who has both auditory and visual impairments, the combination of which causes such severe communication and other developmental and educational problems that he cannot properly be accommodated in special education programs developed solely for the hearing handicapped child or the visually handicapped child.

The Deaf-Blind Center concept is not to be thought of as the creation of a monolithic structure into which we pour all deaf-blind children. Rather, the Center concept is administrative and organizational in nature -- utilizing every available resource to provide services for all deaf-blind children.

Because of the breadth of services needed by deaf-blind children of all ages, and the scattered geographic distribution of these children, it is essential that a number of agencies, both public and private from every state concerned, join together in developing comprehensive regional Center programs. All agencies involved in such cooperative work of the Center are considered Participating Agencies. Those states which have voluntarily come together to develop a regional Center program have designated a Coordinating Agency which is legally responsible for administering the Center program under the grant and will also serve as the locus of the office of the Coordinator of the Center program. (See Appendix.)

II. Deaf-Blind Center Program Objectives

A. The Regional Centers with the assistance of the Participating Agencies, will provide the following services:

(1) comprehensive diagnostic and evaluative services for deaf-blind children;

(2) a program for the adjustment, orientation, and education of deaf-blind children which integrates all the professional and allied services necessary therefor; and

(3) effective consultative services for parents, teachers and others who play a direct role in the lives of deaf-blind children to enable them to understand the special problems of such children and to assist in the process of their adjustment, orientation, and education.

B. The Deaf-Blind Centers will also plan and make provisions for the following activities in order to identify and meet the full range of special needs of deaf-blind children and their parents:

(1) research

(2) development or demonstration of new programs concerned with the education of deaf-blind children.

(3) inservice training of professional and allied personnel working with deaf-blind children

(4) dissemination of materials and information about practices found effective in working with deaf-blind children; workshop proceedings, publications, movies, video tapes, etc.

III. Deaf-Blind Center Planning and Operational Goals

The following stratagems are fundamental to the successful planning and operation of all Regional Deaf-Blind Centers in order to meet the objectives detailed earlier.

1. Identification of deaf-blind population -- We cannot begin to plan effectively in our regional Center areas until we locate these children and identify their needs.

2. Identification of resources available --

   a. Immediate resources which can provide specific programs for deaf-blind children

   b. Potential resources which with some modification, perhaps by means of in-service training, may be adapted to include deaf-blind children in their program.

3. Identification of children presently served --

   a. Type of programs, their location and staffing in each program

   b. What is the future potential of the resources identified, i.e. can they be expanded to include more children; what is required in way of staffing, training and construction, to expand services?

4. Identification of population not served --

   a. This relates to the identification of potential resources (3b) and their expansion.

b. What new facilities must be constructed (day school, private, residential)?

5. Determine the economic cost factors relating to the development of programs for deaf-blind children and their parents--

   a. Identification of population, resources, number of children served and not served

   b. What are the manpower needs on a professional and paraprofessional level?

   c. How many classrooms/facilities needed?

   d. What kinds of programs are needed for the children, for staff training?

   e. What are the construction needs?

6. Develop, expand and increase the number of facilities, programs, and services to provide and assure appropriate services for deaf-blind children --

7. Develop meaningful inservice training programs to improve and upgrade the status of staff in existing programs (especially those institutions for the retarded) to assist them in developing and providing greater opportunities through more meaningful programs for our more severely disabled deaf-blind child.

8. Coordinate all community resources, i.e., medical, clinical, social, institutional, and educational, to provide services for more deaf-blind children and their parents. (Related to #2 identification of resources available)

9. Stimulate the development of Teacher-Training programs. Where feasible, viable relationships should be developed with such university training programs to provide a lifeline of trainees in Deaf-Blind Center programs. (Develop more undergraduate programs modeled after the Michigan State University program.)

10. Coordinate all existing Federal resources to supplement the program needs of the Centers, in addition to the identification of state and local resources for providing these services and for funding.

IV. Center Survey Results

As of April 1970, 2,461 deaf-blind children have been located by our Center surveys, which are still in process. More than 54% of this number, or 1332 children are under 9 years of age. It should be understood that not all of the children located and suspected of being deaf-blind, have had the benefit of comprehensive diagnostic and evaluative services. One of the major objectives of the Center program is to provide comprehensive diagnostic and evaluative services for *all* these children.

In the academic school year 1967-68, only 256 children were receiving adequate educational services -- 100 were in six residential programs for deaf-blind children. The remaining 156 were in programs for the deaf, the blind, public and private school programs. In 1969-70, 802 children were enrolled in educational programs. This leaves more than 68% of our surveyed population (or 1600) without the benefit of adequate educational programs. Some 347 of these children are in institutions for the retarded, the remainder are at home.

The Center programs, in their first year of operation evaluated 161 deaf-blind children. We hope in 1970-71 to evaluate more than 400 children. However, the real challenge to be faced by the Center program comes *after* the evaluation process is completed. Will we have a sufficient number of programs with adequately trained staff for our children? Can we plan comprehensive programs to meet the needs of all our deaf-blind children? The answers to these questions depends not only upon Federal assistance but total local, State, and community involvement.

It is estimated that 4,000 deaf-blind children may have resulted from the 1964-65 rubella epidemics. These children will one day be adults, and will then become the responsibility of the National Center for Deaf-Blind Youth and Adults. We must work closely together to avoid the error of thinking which separates the world of education from the world of rehabilitation -- as if they were two separate and distinct entities. It is essential for the future

well-being of our deaf-blind children, that we consider their vocational needs early in their development.

To this end, I can assure you that the Bureau of Education for the Handicapped, will dedicate its energies along with State and local agencies, so that these children will live a more meaningful and fruitful life *in* this world, rather than *apart* from it.

AREA CENTERS	CENTER AREA SERVED
Mr. Ronald Cyphers, Coordinator Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o Alabama Institute for Deaf and Blind Box 268 Talladega, Alabama 35160 (205)362-8460	Alabama Tennessee Georgia Florida Kentucky Mississippi
Dr. William Blea, Coordinator Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o State Department of Education 721 Capitol Mall Sacramento, California 95814 (916)445-8071	California Nevada Arizona Hawaii
Mr. Don Moriarty, Coordinator Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o Colorado Department of Education 430 State Office Building Denver, Colorado 80203 (303)892-3382	Colorado Utah Nebraska Kansas New Mexico Wyoming
Mr. Lars Guldager, Coordinator New England Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o Perkins School for the Blind 175 North Beacon Street Watertown, Massachusetts 02172 (617)924-3434	Massachusetts Maine New Hampshire Vermont Connecticut Rhode Island
Mr. Charles Weir, Coordinator Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o Michigan State School for the Blind 715 Willow Street Lansing, Michigan 48906 (517)373-3730	Michigan Wisconsin Illinois Indiana Ohio

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Mr. Dennis G. Paulson, Coordinator Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o Minnesota State Dept. of Public Welfare Centennial Building St. Paul, Minnesota 55101 (612)221-3472	Minnesota Iowa Missouri North Dakota South Dakota
Mr. Khogendra Das, Coordinator Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o The New York Institute for the Education of the Blind 999 Pelham Parkway Bronx, New York 10469 (212)547-1234	New York New Jersey Pennsylvania Delaware
Coordinator Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o North Carolina Department of Public Instruction Education Building Raleigh, North Carolina 27602 (919)829-3813	North Carolina South Carolina Virginia West Virginia Maryland District of Columbia
Dr. Edwin K. Hammer, Coordinator Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o Callier Hearing and Speech Center 1966 Inwood Road Dallas, Texas 75235 (214)638-1100	Texas Arkansas Louisiana Oklahoma
Mr. Paul Starkovich, Coordinator Area Center for Services to Deaf-Blind Children Title VI-C, ESEA c/o Washington State School for the Blind Post Office Box 1865 Vancouver, Washington 98663 (206)696-1611	Washington Oregon Alaska Idaho Montana

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THE CENTER CONCEPT FOR DEAF-BLIND CHILDREN

Dr. Edward J. Waterhouse, Director

Perkins School for the Blind
Watertown, Massachusetts

The all-embracing aims of the Center Concept, namely that all deaf-blind children, wherever they may reside in the United States of America, should be given every opportunity to develop their maximum potential, is most laudable.

At present, the country is being divided into ten different regions, in each of which an agency has accepted the responsibility for coordinating services for deaf-blind children in that area. The coordinating agency is not itself the "Center." Indeed, the word Center as used in this act refers rather to all agencies in a region which have services to offer deaf-blind children.

Nor are the regions mutually exclusive. Agencies are not discouraged from offering services to children in other regions if services are not available there, or if parents prefer to have their children served in that way.

The act is strengthened by a generous and all-embracing definition of a deaf-blind child. The act itself does not define deaf-blind children, but the guide lines drawn up by the Bureau of Education of the Handicapped in the Department of Health, Education and Welfare does provide a definition. It is essentially the definition adopted by Perkins over a decade ago and is as follows:

> "As used throughout these regulations, the term 'deaf-blind child' means a child who has auditory and visual handicaps regardless of the degree of impairment, the combination of which causes such severe communication and other developmental and educational problems that he cannot properly be accommodated in special education programs, either for the hearing handicapped child or for the visually handicapped child."

The legislation recognizes that a deaf-blind child's progress depends to a very great degree on the support he receives from the family and also urges that services be rendered to the child at as early an age as possible. Stress is placed on the provision of consultative services to children of all ages and to their families.

The success of a Regional Center depends on many things. The following list, not intended to be in order of importance, includes some of them:

A. Plenty of money. Federal, state, private, local, family. So far, resources are wholly inadequate.
B. An understanding of what is needed to bring a deaf-blind child up to his maximum potential by state officials, special educators, community leaders, and the families involved.
C. Cooperation between parents and participating agencies.
D. Cooperation between participating agencies and the coordinating agency, and among participating agencies directly.
E. An agreement between state departments, private agencies and families concerning the share of the cost each is prepared to bear for services.
F. An adequate supply of fully qualified teachers, child care workers, social workers, psychologists, and administrators to render the services needed and to interpret them to parents and others.
G. Facilities for the training of personnel in the special needs of the deaf-blind.
H. An advisory board to coordinate the planning of regional services and their provision.
I. Provision of special educational services for deaf-blind children adequate to meet the diverse needs of each child.
J. Provision of diagnostic and evaluative services for deaf-blind children.
K. Provision of the widest possible social experiences for deaf-blind children under the direction of trained personnel.
L. Provision of placement services for children completing their education.
M. Provision of services for deaf-blind children who cannot benefit from an educational program.

N. As complete a register as possible of deaf-blind children to be served.
O. A directory of agencies able to offer services.
P. Facilities for disseminating information to all concerned.
Q. Research in the area of the deaf-blind child.

It would be possible to elaborate on each one of these items listed and to prepare a paper on it. Nor is it suggested that the list is complete. In addition, it is not feasible to operate services in a region without consideration of what is being done elsewhere. One weakness of the regional set-up as it has operated so far is the absence of any coordinating or planning group with responsibility for setting up standards on a national level.

This is not intended as a criticism, either of the Act or of those who are working energetically to implement it. The Act certainly does not prevent such a body from being formed. There is a strong case for the view that more progress has already taken place in developing and implementing services for deaf-blind children since the center concept was developed, than in many years previously.

Nor is communication between coordinators wholly lacking. However, such interchange of information that has taken place so far has been limited mostly to reports on what each one is doing. Some of these reports are impressive, especially in those parts of the country where very little, if anything, was being done before. The next step would seem to be to determine whether what is being planned and done is wise. Until national standards are discussed and agreement reached, the influence of the U. S. Department of Health, Education, and Welfare cannot be exerted as effectively as we would hope, and the federal act will fall far short of its goal. No action taken by any state or region can in itself be as effective as action taken on a recognizably national level.

For this reason, a national meeting of Regional Coordinators and Project Directors, together with high representatives of State Departments of Special Education seems desirable. We would hope, of course, that the Department of Health, Education, and Welfare would participate.

This meeting should be soon enough so that the results of the discussions can be effectively used in preparing grant proposals for DHEW for the school year 1971-72. Such a meeting also should

be helpful in determining what kind of Federal support is needed for the coming years. Until standards are set, it would seem impossible for any of us to estimate what our needs should be.

Accordingly, Perkins has extended an invitation to participants to attend such a meeting in Watertown during the third week of October 1970 and we hope that much good planning can result.

THE MULTIPLY IMPAIRED VISUALLY HANDICAPPED IN THE RESIDENTIAL SCHOOL

Jerry Regler

Nebraska School for the Visually Handicapped
Nebraska City, Nebraska

I believe I have been included on this panel because I represent a state where the population is relatively small and is largely rural. Nebraska has a population of about 1-1/2 million. In the past 20 years, an average of five children per year were born functionally blind; i.e., they would have problems with mobility and need to use braille for their medium of instruction. About half of the children live in the Lincoln-Omaha area; the others are spread over 500 miles to the west, rarely more than one in a county. The school itself is in the small town of Nebraska City, (7000), one hour's drive from either Omaha or Lincoln.

I give you this introduction because my first point is that programs must be designed to meet the needs of the people they serve. Also, the program a residential school can provide depends on the resources available where the school is located, and the number and places of residence of the families it serves. For this reason it is difficult to make generalizations but I will try to suggest some factors that should be considered by the staff of most residential schools.

Responsibility:

Residential schools for visually impaired children must accept the administrative responsibility, if not the leadership, in seeing that *all* blind children in their states have an opportunity for education in an organized program. This does not mean that all children who are blind should be enrolled in the residential school, but it does mean that through cooperation with

other agencies and organizations all children will have at least one program outside their homes on which they can depend for an education. If programs are not available it is the administrator's responsibility to organize or cooperate with groups to introduce legislation to designate responsibility within the state for the education of children not now included.

Any residential school for the visually impaired is limited in the numbers and kinds of multi-handicapped pupils it can enroll. It is first responsible for the education of blind children in the state who have no other serious physical or mental handicap. It should have some responsibility even to pupils enrolled in their local school districts to insure that the opportunities provided are adequate. And certainly, as long as the residential school is the only program available to a group of these children it has a responsibility to provide an exemplary program for blind children that is not weakened because of the needs of the multi-handicapped children who may be enrolled.

Sensitivity:

The staff of a residential school must be sensitive to the needs of the individual pupils. Houseparents, teachers, food service personnel, all the staff must accept each child as he is, at the time he enters the program and try to provide experiences that will improve his self-image, confidence and independence. The greatest hazard that can befall a residential school is that the program is designed for an image of what a child who is blind should be and the children are programmed to reflect that image.

Flexibility:

If a school is sincere in providing for the needs of the individual, then the school must be flexible, not only with materials and teaching techniques, but in organization and curriculum. Ten years ago, I thought a self-contained classroom provided the best educational climate for the blind child. I have gone farther away from that concept every year since. We now have an ungraded school and each child must deal with several adults daily. Flexibility is the reason for the change. We are able to give individual help on a one to one basis, perhaps even utilizing some behavior modification techniques, and at other times work with groups covering an age range of several years but achieving at nearly the same level. This organization,

of course, takes a great deal more time to plan and coordinate. In fact, to do it right, the staff needs extra planning days, free from the responsibility of working with the children.

Continuity:

The administration of the residential school must not only take the responsibility to see that all blind children have an opportunity for an education but they must see that there is continuity from their school to the next step. A pupil should never leave the residential school without a plan to meet his next objective, whether it is another school or a job. This means the administration, teachers, and counselors must cooperate with rehabilitation agencies and the appropriate personnel in other schools to provide work experiences, and experiences in independent living skills, so that it is possible to make the transition to what follows. We must take the time to know each pupil and plan a program with him in mind, a program which will change year by year and day by day.

Speciality:

A residential school has some advantages over a day school program. If the staff does not take advantage of their stable environment to work together for the benefit of the children they have no reason for their existence.

They should provide the specialized texts and learning materials that they find most efficient in aiding learning of the pupil who is blind. The very core of the integrated program is that the blind child uses the same texts and materials as his sighted classmates. The best materials for teaching children with sight may or may not be the best for the blind.

Physical education, music, speech, home economics, vocational training, orientation and mobility and other areas which are extremely limited to blind children in integrated programs, must be an integral part of the plan of each pupil in a residential school. To provide a program for multi-handicapped children it probably is necessary to provide a curriculum for children who cannot read and write because of physical or mental handicaps. Residential schools should be planning complete courses in oral instruction for these pupils.

While there is no substitute for braille for independent reading, its practical value is largely restricted to formal education. For children who in several years cannot read independently it is difficult to justify a great deal of time being devoted to further instruction in reading. Pupils should have a chance to learn as much as possible from listening to information and practicing first hand the application of what is to be learned. Many experiences are necessary before a pupil can generalize concerning a single concept and this takes a great deal of time under the guidance of teachers and houseparents who can recognize practical learning situations.

It is unfortunate that, although we have seen the need of including multi-handicapped children in the program for the blind and we have learned some of the techniques that are successful, it has not been possible to move more rapidly in implementing programs. We help no one when we accept the responsibility for educating multi-handicapped children without the personnel to work with them, and until funds are appropriated to meet the needs of these children it is not possible to offer a program for them. One of the most difficult decisions usually comes when funds are made available because they are usually insufficient to enable all multi-handicapped children to be served. In this case it is necessary to accept first the youngest of the children simply because there is more chance of making progress with them.

With the current emphasis on programs for handicapped children surely, through cooperation with all agencies, a program can be made available that is suited to each child.

THE MULTIPLY-IMPAIRED VISUALLY HANDICAPPED IN THE RESIDENTIAL SCHOOL

Margaret Polzien, Principal

Michigan State School for the Blind
Lansing, Michigan

DEFINITION

A multiple handicapped child at the Michigan School for the Blind has, in addition to his visual impairment, one or more of the following handicapping conditions which require special services and adaptations of his training, educational instruction, and materials:

Mental retardation
Hearing impairment
Speech impairment
Emotional disturbance
Crippled
Other (Health)

HISTORY

The first services for multiple handicapped children at the Michigan School for the Blind began in 1949 when a class for three deaf-blind children was organized. Two years later an additional teacher was added to meet the needs of increased enrollment. Currently, this department consists of twenty-four deaf-blind children at various training and educational levels with a staff of nine teachers and four teacher aides.

In 1956 a class was organized for emotionally disturbed, mentally retarded and crippled children and was started with a trained teacher. Services for these children were expanded in 1958 and have steadily grown. At present forty-one students are taught in

six special classrooms by an instructional staff of six and two teacher aides. These students are integrated into some regular classes when feasible.

The 1969-70 enrollment of multiple handicapped children totaled 112. In addition to the special classroom placement mentioned, many multiply-handicapped children are integrated into regular classes. With the exception of five day students and fourteen pre-school deaf-blind children, all multiple handicapped pupils are integrated in the resident dormitories.

OBJECTIVES

In addition to the objectives common to all the students at the school, the classes for multiple handicapped children strive for specific goals.

Parents are counseled to be more realistic in the acceptance and enjoyment of their child, thus creating a more receptive home environment.

Teachers are cognizant of materials, research and development in their particular area of instruction.

Teachers provide the training and educational experiences for each child according to his individual ability and development which may necessitate individualized instruction, slower pace and presentation of concepts in a relaxed atmosphere and use of numerous classroom learning aids.

Teachers recommend classroom placement for those who acquire skills which make possible functioning in a regular classroom.

Teachers provide a variety of meaningful experiences through concrete activities, field trips and demonstrations.

Teachers develop each child's physical, mental and emotional capacities to the fullest extent.

Teachers reduce frustration by presenting materials to the individual child at a level at which he can experience success.

Children develop a realistic and healthy self-concept.

Children are trained to be as independent and self-sufficient as ability permits, which for the pre-school child includes training in eating, sleeping, toileting, walking, dressing and bathing.

Children have some form of communication. (Oral communication is stressed initially, but if this cannot be achieved, then manual and written communication is introduced.)

Children develop skills of social and daily living.

Children are integrated into as many school activities and programs as possible: physical education, occupational therapy, music (group and individual), home economics, recreation, scouting and other club activities.

Children develop self-expression and self-control.

Children attain mechanical skills, hobbies and other recreational pursuits.

PROGRAM SUMMARIES

The Deaf-Blind Program has sixteen children between 3-1/2 and 5 years of age and eight youngsters from eight to twenty years of age. Fourteen of the 3-1/2 to 5 year olds are residential students, housed in Huron Cottage, which also serves as the training setting for twelve members of this segment.

The Deaf-Blind Program has one Supervising Teacher who is certified for teaching deaf-blind. She also serves as Intern Consultant for five Intern Teachers who completed their certification for teaching deaf-blind at the end of the current school year. In addition, there are two full-time and one half-time certified teachers, one teacher certified for teaching orthopedically and visually impaired, and two teacher aides who are high school graduates.

Physical facilities include Huron Lodge, a self-contained living-learning cottage, two self-contained rooms in the Elementary School Building designed to provide individual instruction for three of the younger children and four of the children aged eight to thirteen, and one classroom in the Secondary Building for the four older students, aged fourteen to twenty.

The motor activity equipment for this department includes a climbing house, walking ladder, balance equipment, tricycles, wagons, carts, large wooden blocks, stairs and tumbling mats. Sense training equipment lists vibration boxes, auditory equipment, language kits, pianos, bass drum, record players, tape and cassette recorders, toys and games. An enclosed play area with suitable equipment adjacent to the cottage is available.

The Elementary Program for Emotionally Disturbed and Mentally Retarded Children serves twenty-four, ranging in ages from five to fourteen. One teacher is certified in the areas of visual impairment and mental retardation. Two are certified teachers of the visually impaired, the fourth has certification in the visually impaired with additional course work for deaf, mentally retarded and emotionally disturbed. Volunteer assistance is available upon demonstration of need.

Instruction is provided in four classrooms, two of which are self-contained and have adjacent activity rooms. Special equipment includes a closed circuit television, record players, cassette and tape recorders, wheelchairs, cages for the care of small animals, and assorted games, blocks, puzzles, cards, art and instructional materials.

The Secondary Program for the Emotionally Disturbed and Mentally Retarded has a current enrollment of seventeen students, nine are enrolled in Junior Prep and eight in Senior Prep. There are two teachers, one certified in mental retardation, visual impairment and social work; the other has certification in elementary education, visual impairment and mental retardation.

Their physical facilities include a Junior Prep and Senior Prep classroom in the Secondary School Building and these students are also integrated into numerous high school classes. Special equipment lists a closed circuit television, record players, tape and cassette recorders, piano and large areas for storage and typing.

CURRICULUM GOALS

1. Language Arts

   A. Help children to increase in oral and written communication.

B. Adequately help children to listen and realistically interpret what they hear.

C. Teach reading skills to each child to the limit of his capacity.

D. Instruct in the proper use of learning aids and special equipment -- talking books, braillers, braille typewriters, typewriters, tape recorders, writing guides, hearing aids, earphones, and glasses.

II. Numbers Concepts

A. Practical teaching of concepts

1. Teach number concepts that have immediate application to children's daily lives, such as money and time.

2. Application of number concepts to daily living.

3. Recognition of reasonable estimate in applying number facts.

B. Develop quantitative thinking in arithmetic number concepts.

III. Science and Health Education

A. Develop a recognition and an appreciation of the balance of nature.

1. Relationship between climate and plants.

2. Adaptation of all living things to their environment.

3. Adaptation of man to his changing environment.

B. Practical application of man's relationship to his environment.

1. Personal hygiene.

2. Safety.

3. Sex education.

4. Man's expanding universe.

IV. Social Studies

A. Understanding the inter-relatedness of man and hi social environment.

1. Family living.

2. Community relationships.

3. State -- allocated functions and responsibilities of the state and its citizens.

4. Nation -- our 50 "united states."

5. World -- power structure, customs, culture.

B. Actual participation in an expanding environment.

1. Field trips

2. Guest speakers and programs

3. Related activities

4. Special learning aids -- maps, globes, etc.

C. How geographical locations influence the life and work of people.

D. How history influences culture and customs.

V. Fine Arts -- develop creativity, understanding, and appreciation of art, music and literature, and encourage participation as a means of enjoyment and self-expression.

A. Art

1. Coordinating art with other subject matter.

2. Motivate active participation in artistic activities.

B. Music

1. Develop listening skills

2. Develop musical potential of individuals through specialized instruction.

C. Literature

1. Understand content and appreciate form through listening and/or reading.

2. Enable the student to interpret the content in order to draw conclusions.

VI. Physical Skills

A. Make the children independent and self-sufficient, as they are capable. For the younger children this includes:

1. Dressing

2. Eating

3. Sleeping

4. Gross body movements

5. Toileting

6. Walking

7. Bathing

8. Climbing -- jungle gym and steps

9. Running

10. Bike riding

B. For the older children who have the above skills, the following are stressed:

1. Orientation and mobility

2. Body image

3. Posture

4. Manners

C. When they are ready, the children are integrated into regular gym classes, which include:

1. Organized sports and games

2. Calisthenics -- gymnastics

3. Swimming

4. Dancing

5. Wrestling

6. Bowling

7. Roller Skating

8. Trampoline

VII. Social Skills

A. Teach social skills and behavior acceptable to peers and society.

B. Develop an acceptable personality.

1. Manners

2. Grooming

3. Consideration of others

C. Realistically appraise their potential and limitations and to make a successful adjustment.

D. Develop an attitude of sincere appreciation for the many forms of community assistance.

VIII. Vocational Training and Work Experience

A. Vocational opportunities in which they can realistically achieve experience in those areas which are available to them on campus after school hours and for which they receive hourly pay. These include:

1. Dining room
2. Food delivery
3. Bakery
4. Kitchen
5. Janitor
6. Library
7. Braille transcriber
8. General library aide
9. Switchboard
10. Houseparent
11. Office thermoform
12. Print shop

B. Prevocational courses are given in caning, weaving, piano tuning, home economics and industrial arts.

COMMENTS: Although opportunities for qualified applicants are limited, the existing experiences are very good for the

participants. / full-time rehabilitation counselor works with and places students in the above areas after assisting them in obtaining their social security cards and, if necessary, their working permit.

IX. Leisure Time Activities

A. Introduce additional entertaining activities in the residence halls:

1. Checkers -- Dominos -- Chess
2. Bean bag games
3. Bingo
4. Picture and word card games
5. Knitting
6. Weaving (potholders, eg.)
7. Cootie
8. Simple cooking (cookies, cakes, popcorn, etc.)

X. Recreation -- The multiple handicapped children participate with their peer group in the school's recreation program.

WORK EXPERIENCE FOR THE MULTIPLE HANDICAPPED

A. Integration in Campus Work Experience Program

In the campus work experience program an attempt is made to involve the multiple handicapped students. This year at least one deaf-blind student worked on the program in the kitchen. We also had another deaf-blind student last year. We included in other areas blind, retarded students primarily in those positions that required lesser amounts of responsibility. These students are selected on the same basis as all other students in this particular program. They have to complete an application, submit to a job interview procedure, complete the necessary personnel forms and abide by the rules and regulations of the

program, maintain an established level of work performance, responsibility, dependability and other work attitudes. For this they receive a bi-weekly pay check and contribute to the various income taxes and retirement funds. They work side by side with our regular school staff and must adapt to the respective work situations. Periodic evaluations are made in regard to their performance, attitudes, etc., and counseling and guidance administered when problems arise.

B. Chick-N-Joy Project

This is a special project reserved for junior and senior prep students in which they work after school for approximately an hour assembling Convenience Packs for a local Chick-N-Joy store. This involves putting a napkin, plastic fork and knife, and a tube of salt into a waxed-paper sandwich bag and stapling it shut. This is done by using an assembly line technique in which one student is assigned one specific job and then the work passed to the next student until we have the finished product. The finished product is then returned to the store and payment is received at the rate of one cent apiece. This is distributed among the students on the basis of the number of days they worked. The money is paid in cash rather than in check form. This program will accommodate six students, all of which are mentally retarded or emotionally disturbed. Guidance and counseling is given and standards of production are insisted upon. Quality control is also maintained.

C. Comments

Performance on either of these programs offers the rehabilitation counselor an opportunity more realistically to recommend post-high school training to the respective field counselors of the Division of Services for the Blind. In some cases this means a saving of rehabilitation case service funds and a shortened rehabilitation period.

THE MULTIPLY-IMPAIRED VISUALLY-HANDICAPPED IN THE DAY SCHOOL

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The concept of the type of student who can succeed in a public school day program has changed during the past few years. Previously, discussion centered around whether the child was functioning at a high enough level to include him in a day program. However, today the children who have been excluded from residential schools are under consideration. Thus multiply handicapped children have placed a new focus on the type of children currently enrolled in day programs.

In discussing the multiply handicapped child in a day program I have been asked to discuss the Team Teaching Practicum for Teacher Preparation in Multiple Handicaps, A Special Project from the U.S. Office of Education, that has been carried out for the past year and which was pilot studied the year before. This program involves "excluded" children from ages 3 to 9. "Excluded" means these children have been refused admission to traditional programs for normal children and in special education. Next year work will begin with children from birth on, hopefully to avoid some of the multiple handicaps that are now seen.

The program came into being because there did not seem to be an ideal practicum for teacher preparation in multiple handicaps. The ideal number of children that a teacher in multiple handicaps could handle was unknown and there did not seem to be one teacher who had all the attributes needed to teach the...

Thinking about what would go into an ideal practicum it was necessary to throw out all prior training and all of the traditional ideas held about the types of children to be taught. What really was needed? What were the important areas for developing?

It was decided after some thought that there would be four emphasis areas of development in the curriculum. One would be self-care skills which would cover basically eating, toileting, walking, and other skills needed to succeed in a program. Another area would be speech and language and this included everything from non-verbal behavior to defective articulation. Listening skills would be stressed. The third area was adaptive behavior. This would be a "getting ready period" for the children. Everything was included from basic deficiencies to reading readiness for attainment in a traditional educational program. The fourth area was motor development and included everything from body image to mobility for those children needing it.

Knowing that there were four areas and very few teachers who were competent in all four areas, a team teaching approach was chosen. There would be one teacher for each of the areas: speech and language, adaptive behavior, and motor development. All three teachers would handle the self-care skills.

Excluded children were selected for several reasons. It was felt that if success were achieved with excluded children and these excluded children were able to enter into a regular program, then success could be made with higher level children by continuing their development from a very low level of functioning on through school age behaviors. Another reason for selecting the excluded population was that it was readily available. Children had been excluded from school for various reasons and were currently sitting at home. Many of them were known to various agencies around the community and there had been prior contact regarding possible placement for them. Therefore a list of names was available from which to select students.

The range of ability of these excluded children was surprising. One child was completely competent in all areas but expressive language. Another child could literally do nothing - not even hold up his head. Still another with normal intelligence had been sick for the beginning years of school and then had been excluded because she was too old for the beginning class. The range of abilities was indeed broad!

The choice of students was also made on the basis of including as many different handicapping conditions as possible because this was a teacher preparation program. It was felt that the student teachers who have had contact with various types of handicaps

would be more willing to accept them into a program once they were in a teaching position and able to accept or exclude pupils.

The differing abilities made it very difficult as far as teaching was concerned and a narrowing of the types of conditions and range of ability was considered so that it would be a more homogenous group and more easily handled by the team of teachers. However when this was suggested to the students who had just completed their programs with the broad group of students, they were almost unanimous in their objection to homogeneity. They felt it was one of the best things possible in their learning experience to have a wide variety of handicaps and a broad range of handicapping conditions in this way they could see how the team of teachers handled the groupings and activities to make a learning situation that was maximum to each student.

Having decided on the areas of emphasis and on the type of child that would be involved, groups were chosen for the team of teachers according to the child's level of functioning in each area: the motor, the adaptive behavior, speech and language, and self-care skills. This meant that the children were grouped into three groups in each of the four areas. There was a high, medium and low group in speech and language, another high, medium and low in motor development, another in adaptive behavior. One child at a time was brought into the classroom with a program being set up for that one child. As soon as the child was functioning well within the schedule another child was added.

In doing this it was found that the children could not be categorized by handicapping conditions. The deaf and the blind could very well be grouped together in one group. It was found that the children consistently were inconsistent in that they were high in one area, low in another area, and medium in another. It made a great problem as far as grouping the children was concerned because each group was unique. It was felt, however, that each child should see each teacher each day and therefore the groupings rotated among the various teachers. This caused a tremendous problem in scheduling but once the scheduling was established it became a very feasible working situation. The program had to remain very adaptable because the children, as they made gains, were constantly changing from group to group.

For grouping purposes it was found that individualizing instruction was paramount. Regular classes more and more stress the fact

that they are individualizing instruction but it was necessary within this setting to do even more. The need evolved to know exactly where to begin with each child. The answer to this was based upon the information given to us in child development. For instance, in motor areas six year olds are very active, seven year olds become more cautious and nine year olds play hard until they are exhausted. Such information was necessary for us in planning and establishing the various grouping and the curriculum involved. In cognitive development six year olds can tell the difference between two simple objects, seven year olds can give the similarities between two simple objects, but eight year olds can give the similarities and differences between simple objects. At nine the idea of independent critical thinking emerges. These were facts that had to be considered. Where is the child now and where should we take him? In language, six year olds use language aggressively. They call names, they argue, they threaten. Seven year olds use language complainingly, eight year olds are out of bounds verbally with exaggerations, a great deal of talking and tall tales, but at nine language begins to be used as a tool. It was felt that most of our children, although they were not at the six to nine year old levels in language, were at a progressive stage of development and it was necessary to reach down in the child development levels and take them from where they were to where we wanted them to be for their particular mental age and level of development.

In self-care skills it is known that six year olds have a large appetite but refuse foods by spells, seven year olds have moderate appetites, eight year olds have excellent appetites with few refusals, and nine year olds have their appetites under better control but they frankly refuse certain foods. At ten the children love to eat, eat tons of food, and are constantly filling their empty stomachs. Here it should be pointed out, as mentioned previously, that a child might be functioning within a high level in motor development, a low level in speech and language, and a middle level in adaptive behavior. However a child can also function within one area at a very, very broad level. One of the children in our program, as you can see by the slide, has skills in the language area that range from a few months to that of 3½ years. He is deaf and therefore does not make the sounds that would go along with his age level. At four years of age he is able to follow directions like a 3½ to four year old. He has inner language like a four year old. He socializes with his mirror image like a two year old and his expressive language is

below the first year level. The same is true with his adaptive behavior. He plays well with others at the three year old level. He can put together puzzles at a three year old level but he's still on a one year old or eighteen month old level in that he takes naps after school. He responds to music as a two year old, but he is extremely happy and prideful in what he makes with his hands which would be three year old level behavior. In self-care skills he is able to wash his hands much as a two year old but he has difficulty in buttoning his clothing and taking off his coat because of his cerebral palsy condition. However he is able to function as a three year old in putting away his clothes. He can eat by himself. He has a good appetite but he's at about an 18 month old level in toileting behavior.

It's important to recognize the fact that we cannot immediately pigeonhole students into one particular age level of child development. Let's take two 14 year old boys who function at the same level as far as their achievement scores are concerned. Their scores place them at the same level in word meaning, in comprehension, and in arithmetic comprehension. However it should be noted that they vary a great deal in word recognition, in oral spelling and in listening. Therefore, even though they are functioning on the same level as far as comprehension and word meaning are concerned, you would have to take into consideration the very wide variation in word recognition and particularly in listening comprehension when planning their programs.

In establishing a program for the children that we had enrolled it was necessary for us to set up very short activity periods because the children had extremely short attention spans. It was decided that the small group and the large group activities would be alternated, and that there would be quiet activities interspersed with more active ones. One of the reasons for doing this was that the team of teachers did not have any additional help available to them. Therefore by alternating the small group activity it meant that a teacher could take a child off for toileting or for individual attention while the other two teachers held the large group. The quiet and active groupings were made to allow the children a means of getting rid of their fidgety behavior so that they could sit quietly during the very brief periods. After this had gone on for a period of time it was possible to lengthen the periods where the children quietly had to attend.

Many traditional ideas were broken in setting up the new program for multiple handicapped children. Each child was not placed with one teacher to get used to that particular teacher. It was felt that the children could learn to relate to more than one person and so they were exposed not only to the team of teachers but to the various student teachers and student volunteers in the classroom.

It was felt it was not the number of teachers who made the difference in the child's relating to them, it was the consistency of the teachers. Therefore some means was necessary so that all of the personnel within the classroom would be using consistent behavior with the children. Charting behavior became the technique decided upon for this purpose. In the hand washing activity, hand washing was broken down into sequential steps and the progress of each child was plotted on a chart that was placed in back of the sink. Each child's name was placed on the chart and a square was filled in with bright red magic marker for each step of the hand washing activity that he could carry on by himself. If he needed help in carrying on the activity the square was outlined with red but left white in the middle. This meant that anyone who looked at the chart could see which stages he could do by himself, which were the stages where he needed help, or if the square was left completely white, what he had to have done for him. However each child was placed through the whole sequence of steps in hand washing each time that he washed his hands. Any child who was able to accomplish any of the steps by himself was expected to carry out that activity. This enabled all of those working with the children to have consistency in their handling.

When the student teachers came into the classroom, charting behavior was carried further into the steps of precision teaching. This meant that each of the children's lesson plans was broken down into the behavior that was desired, the conditions surrounding that behavior, what specifically was to be done to elicit the behavior, what was to be done if the child accomplished the behavior, and what was to be done if he did not.

Precision teaching evolved because one little boy was ready for spoon behavior and the lesson plans evolved around the use of a spoon. One of the teachers working with him would say "take your spoon." Another would say "get your spoon" and still another would say "pick up your spoon." In essence this child was receiving three different commands instead of the one command that was

wanted. The lesson plans were blocked out so that there would b the behavior that was wanted - to pick up the spoon, and the con ditions surrounding it - he would be seated at the table with his spoon at the right hand side. The command to elicit the behavio would be "get your spoon." If he did it, the teacher was to say "good boy." If not, his hands were to be taken and physically placed on the spoon so that he would take it. After working on this idea of a common lesson plan the techniques of precision teaching were used as a measuring device. This was carried out for several reasons: for a record of achievement of the childrer It was necessary to know what he was learning and how rapidly he was learning it. Knowledge was needed as to effective reinforce and effective techniques in teaching him. Measurement of change was needed for the satisfaction of the child. Many of our children were able to recognize and to see the gains that they had attained. It was also desired for the satisfaction of the teacher. When working with multiple handicapped children the gains ir behavior are often so small that some are realized between Septer ber and later in the year but it's very important to know that these gains are consistent and that there's some kind of record of successful attempts at change.

Precision teaching with its specific goals necessitated breaking down classroom tasks. For instance, with washing her hands one of our children sometimes was able to do things and sometimes could not. It was found that her very inconsistent behavior resulted because she was unable to take the first step - the locating of the sink. When she was able to locate the sink satis factorily she could do several of the other steps. However if she was not able to locate it immediately she became so upset that she was not able to carry out any of the steps in hand washing.

It was also necessary to break down the tasks to where the children could succeed. The hand washing activities were consistently started at the beginning and carried through for each child. There was only one activity where all the children could succeed and that was that they could take a towel from the paper towel dispenser and pull it down. Therefore each child experienced success in the step where he could, but the whole routine was carried out.

Other tasks had to be broken down much more minutely than normally. Some behavior charts can be answered with "yes" or "no."

For instance, in drinking behavior the chart read "lifts the cup off the table to drink" with the next step "drinks from a cup independently." In looking back at this activity it was found that there were several steps between lifting the cup off the table to drink and drinking from a cup independently. First of all the child could lift the cup off the table to drink and needed help in getting the cup to his mouth and help to return it to the table. Then the cup could be lifted off the table to drink and the child could drink independently but needed help getting it back on the table. Still later the child could lift the cup off the table to drink, could drink from it and then place it back on the table independently without spilling it. There were many things that were similar to this. It was essential to break down activities to make them to the level of the child. In using precision teaching care was taken to pinpoint the behavior before and during the applications of consequences. Only those behaviors that would be consistent positive learning experiences for the children were programmed. By recording these changes, it was possible to have behaviors in a positive area and they continued even after the consequences were removed.

There were other factors involved in our program. Parents met one day a week in a group situation. The mothers came to consider this their day off and looked forward to the socialization and learning that came from other parents of handicapped children. Next year this parent training will be expanded into the home situation so there will be a better continuum for the activities started in the classroom being carried on in the home.

There were also psychologists in the classroom. It was felt that it was very important to involve psychologists so that they could learn to evaluate extremely handicapped children. Too often the psychologists look at these children, decide they have had no experience with them, and really don't attempt to evaluate them. Therefor the psychologists have been involved with the children in various ways and hopefully will be more adequate in testing situations. Several of the psychologists are now interested in establishing some kind of learning activity that will present an indication of learning potential rather than an IQ test score of present level of functioning.

Aides from other types of programs were also involved with the children. Aides often were responsible for particular educational aspects of their programs and so were presented with the ration-

ale and ideas of the team teaching practicum so that they could adapt pertinent parts for their own settings.

In essence this is what is being done with multiply handicapped children in a day school setting. It has been found that children who have been excluded from other programs because of multiple handicaps can learn, they can succeed, and above all they can be placed in traditional special education programs as well as traditional educational programs and they can succeed in those settings.

THE MENTALLY IMPAIRED VISUALLY HANDICAPPED IN A NON-TRADITIONAL INSTITUTIONAL SETTING

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I. Extent of the Blind Mentally Retarded

How extensive is the problem of the blind mentally retarded in state institutions? As a result of a nationwide survey conducted in January 1968 as part of a special project, a questionnaire was devised and sent to 142 state institutions for the mentally retarded as listed in the *American Association of Mental Deficiency's Directory of Residential Facilities for the Mentally Retarded*, 1965. This questionnaire was sent only to state-supported institutions, and did not include private facilities or public or private residential schools for the blind. The results of the questionnaire are based on the returns of 136 out of 142 state institutions, representing 47 of 49 states, plus the District of Columbia. (Alaska is not listed in the directory and the Commonwealth of Puerto Rico has only a private institution for the mentally retarded.)

Survey Findings

Number of States Reporting	48
Returns	95.8%
Number of Residents*	6,797-6,900
Sex Distribution*	
Males	3,058-3,100
Females	3,739-3,800

*Some institutions reported a range of figures or errors in tabulation.

Age Distribution

	Number	Percent of Population
0-5	370	6%
5-18	2,872	44%
18-25	1,451	22%
25+	1,844	28%
Total	6,537	100%

1. There is a significantly large number of blind mentally retarded children and adults in residence in state institutions for the mentally retarded.

2. More than half of this population (66%) were between the ages of 5 and 25 years, the crucial years in education and rehabilitation.

3. Many of this population, in addition to blindness and retardation, have physical and emotional problems. This was determined by an "additional comments" section on the questionnaire. Truly, the descriptive term "multiply handicapped" is applicable to this segment of the blind population.

4. Some of the institutions indicated that three of the major reasons they lacked programs for this group were (a) problems of financial assistance and resources, (b) lack of effective programs in other state institutions which could be utilized as reference models, and (c) lack of trained professional staff.

5. The approximated total population of 6,797-6,900 blind mentally retarded persons in institutions for the mentally retarded represents various degrees of retardation, from profoundly to moderately retarded.

6. I would not hesitate to postulate from the survey results that approximately 20-40% of the blind mentally retarded segment in institutions for the mentally retarded could probably profit from a systematic program in the habilitation or rehabilitation area.

7. Less than 12% of the institutions indicated that they presently had some form of education or rehabilitation program. A priority for program development needs to be established, either on a national or state level, in those states that have reported a significantly large population of blind mentally retarded per-

sons.

8. The present survey results represent only a small sample of the blind mentally retarded population. It did not include those blind mentally retarded individuals who may be at home or in private institutions for the mentally retarded, or those who may be in residential schools for the blind.

9. Since this survey, a number of young deaf blind mentally retarded children have been entering various state institutions throughout the country. It is probable that the incidence of multiply handicapped blind in the state institutions will continue to increase significantly in the next few years.

10. Finally, I would not hesitate to project from the above figures that there are probably between 16,000 and 24,000 individuals in the United States who are both blind and mentally retarded. Taking the number of blind persons in the United States as 500,000 would result in an incidence of retardation in the blind population of approximately 5%, a conservative estimate. Incidence of mental retardation in the total population of the United States has been estimated as somewhere between 3 and 10%.

II. Greene Blind Unit

The Greene Blind Unit is part of the Walter E. Fernald State School, a state-supported institution located approximately seven miles west of Boston. Established in 1848, it is the oldest state school for the mentally retarded. Its founder, Dr. Samuel Gridley Howe, was the director of the Perkins School for the Blind. Since its founding, this institution has had and continues to have many far-sighted superintendents. Under the leadership of the present superintendent, Malcolm J. Farrell, M.D., the Greene Blind Unit was planned and constructed.

The Greene Blind Unit opened in 1954 as a result of increases in cases of retrolental fibroplasia, and is currently the only special facility for the mentally retarded blind in the Commonwealth of Massachusetts.

The resident population of the Unit is approximately 250 individuals ranging from one year of age up to the older geriatric group.

Situated in the Unit are living, recreation, and educational facilities. In addition to the Unit, there are many other buildings at the institution which include dormitories for 1600 sighted residents as well as 25 blind persons who are not residents of the Greene Blind Unit.

III. Unitization

In January 1970, two state schools in Massachusetts were selected to pioneer a revolutionary administration restructuring. The Walter E. Fernald and Paul A. Dever Schools were chosen as initial institutions to be unitized. As a result of unitization the School has been sub-divided into smaller functional units, headed by a director with considerable authority and responsibility in his respective unit. This reorganization has had several important consequences. First, the unit director will be assisted by a team with considerable knowledge about each of its residents so that an individual program can be designed for each resident. In the past, observations and decisions had to percolate through so many levels of authority that it was difficult to make an effective response to the resident's needs.

Secondly, communication has been improved among staff, residents, and community agencies. Under the unit system, the unit director and his staff will all be responsible for one group of residents, and resultant programming. Communication concerning individual residents thus can be a daily occurrance. Each unit director and staff has ready access to professional consultation. Unitization will result in better communication with the residents' relatives and those community agencies which might be helpful in each resident's educational program.

Thirdly, most policies can be formulated and set at the unit level. Rules and procedures can be set in accordance with the Unit's need and mission. Under the old system, one set of operating procedures had to be applied to all buildings, and hence did not fully meet the needs of many of them. Probably the most important aspect of the Unitization is the emphasis that each unit has a purpose over and above that of providing custodial care which encourages the concept that residents are to be transferred in accordance with their accomplishments and needs.

A consistent and logical program can most readily be designed and developed at the unit level to fulfill one specific function,

such as preparation for life in the community, physical habilitation, self-care or, when appropriate, optimal and humane basic care, or a fuller life within the institution.

The exact composition of a unit team will depend on the function of the Unit. A team might consist of a unit director, nurse, physician, educator, psychologist, social worker, occupational therapist, physical therapist and rehabilitation counselor. Other members may be provided upon consultation.

The two programs which I plan to describe are representative of the wide spectrum of our population. The first is a relatively new program for young deaf blind children and the second is for residents in their early teens up to mid-fifties.

During the past two years, young deaf blind children have been admitted to the Greene Blind Unit of the Walter E. Fernald State School. These young multiple handicapped children are the result of the 1964-65 German Measles epidemic.

In January of 1970, as a result of this increase, it became necessary to develop a special Living Unit Program. Seven of these children from our population were selected to participate, and were placed in a special Living Unit. The immediate objectives during this initial phase were first to provide a stimulating sensory environment; secondly, to develop and encourage basic self-help skills; and thirdly, to provide a diagnostic atmosphere to evaluate each individual's potential.

Professional consultation, assistance and guidance for this program were provided through staff members of the New England Center for Deaf Blind Children under the direction of Mr. Lars Guldager. Through this center, arrangements were made with the Perkins School for the Blind for five of our attendant nurses assigned to the Living Unit Program to participate in classes at Perkins where they had an opportunity to observe and learn techniques which have proven to be effective with the deaf blind children at the Perkins School.

Presently, we have had to restrict the number of children in the Living Unit Program to the original seven. The reason for this restriction was due to the fact the five attendants assigned to the program had to be siphoned from other wards of the Greene Blind Unit thus reducing the number of basic care and program

staff for these areas. Furthermore, it was believed by serving a smaller group of children through a low child-staff ratio the objectives of the program could better be realized. Some of the accomplishments thus far achieved have been encouraging and satisfying. All of the children in the Unit have advanced from eating puree to whole foods. All are presently feeding themselves, two of the seven have been toilet trained and the remaining five are in the process. These developments have been achieved over only a five-month period of time.

Presently, we have, in addition to the seven active Living Unit children, two more residents of the Greene Blind Unit who will shortly be involved in the program. Furthermore, as of May 1, 1970, a total of 14 additional deaf blind children are presently on our waiting list. These 14 additional children represent known Rubella Syndrome children and do not include those children on the waiting list whose major defects are blindness and retardation.

Initially the Living Unit Program was primarily focusing efforts upon the development of feeding, dressing and toileting skills but since it has expanded to include sensory stimulation, personal hygiene, mobility and gross and fine muscle coordination. Weekly field trips are planned and organized in order to provide environmental stimulation and opportunities to observe these children in a variety of settings.

Presently, the Living Unit operates on a twelve-hour day and seven-day week schedule. It has been observed that in the development of certain skills the child's environment must be controlled in order to insure consistency. Staff hours are organized and rotated to cover vital aspects of the children's program. The successes which have been achieved thus far have been the result of the consistency in the program, repetition, and individual behavior modification. In the primary stage of the development of a skill, such as feeding, individual staff assistance is given for a period of time, then a gradual withdrawal of assistance is started to a point where the child can handle the particular skill independently. The amount of time which may elapse between the introduction of the skill, through the withdrawal period to independent functioning varies with individuals, but will usually range from three to five months.

Most of the equipment which is used in the Living Unit Program

has been of no special design. Empty cardboard boxes, plastic milk containers, tin cans, rubber balloons, lengths of rope, spoons, pots and pans, various size balls have been found to be effective materials during periods of free play.

During periods of structured sensory stimulation time, play dough and various teaching materials from Creative Playthings have been found useful.

In order to insure consistency when the children may go on a home visit, monthly meetings of an informal nature have been arranged with groups of parents. These meetings are held in order to have the parents become actively involved in the Living Unit Program. Through discussion, approaches developed by staff of the Unit are shared with the parents in order to insure consistency of the skills at home. These meetings have also helped the parents overcome possible emotional involvement which they may have as the result of institutionalization of their child. All of the parents have expressed enthusiasm concerning the progress their children have made.

It is believed that frequent parent-staff meetings will prevent the isolation of the child in an institutional setting. Since the establishment of the Living Unit, the frequency of parental contact and home visits of the child has sharply increased. Eventually, it is hoped that a staff member of the Unit will work with the child and the mother in the home when the child goes home on extended visits.

Though the Living Unit Program is in only its initial stages of development, further expansion is being planned for September of this year. Additional staff has been requested, including seven teachers of the deaf blind and nine additional ward personnel or child care workers. It is believed that the present group of children in the program have achieved a sufficient level of self-control whereby formal educational training may be introduced. Hopefully some of the children in the program in the near future will be candidates for another educational setting outside the institution. Those unable to profit from an outside setting will be continued in the institution's programs.

The second program I wish to describe developed as a result of a three-year study conducted by Boston College and financed through the Rehabilitation Services Administration. The purposes

of this study were to determine if blind mentally retarded residents in a state institution for the mentally retarded could profit from a systematic program of orientation and mobility; if so, to what extent, and which methods of instruction would be most applicable with this segment of the blind population. During the study, a number of residents had become mobile but had no specific mobility objectives; as a result, job placements were sought within the institution's service industries and mobile residents were trained and placed in work situations. Presently, 15 residents are receiving vocational training. In March of this year, 9 of our residents who had been in vocational training and placement left the institution for further vocational training in an 18-month program conducted by the Protestant Guild for the Blind in Rowley, Massachusetts. Two residents have returned to their homes in the community. Three older residents have been placed in a private home by the Massachusetts Commission for the Blind. All of the residents who have left the institution had been involved in the three-year study.

The location of the Greene Blind Unit has been an asset in the development of its program. Graduate students in the field of orientation and mobility from Boston College spend part of the practicum training at the Unit.

Graduate teacher trainees from Perkins School for the Blind have been assigned to the Unit as student teachers. Undergraduate teacher trainees in Mental Retardation from Boston College. Boston University, Lesley College who have indicated an interest in the area of the retarded blind have student taught at the Unit before entering graduate study in the area of blindness. These students have contributed greatly to the programs at the Unit.

Programs with various private agencies for the blind have been encouraged and developed. Community oriented groups have been in operation for the past year with the Massachusetts Association for the Blind. Two nights a week and one afternoon, groups of our residents attend group sessions at various local community centers with trained group workers from the Association. These group meetings aid residents in adjusting to their local communities and provide experiences which an institutional setting cannot.

Beginning in July, a low vision aids clinic will be established at the Unit by the Boston University Clinic. This will enable

the residents of the Unit to be evaluated for use of such aids.

It is the policy of the Unit and the Walter E. Fernald State School to encourage and develop program affiliations with community agencies and universities.

The pre-vocational readiness program is designed for those residents whom the staff believe could profit from such experiences. A resident will initially be assigned to the Task Management Program where staff members can evaluate the individual's strengths and weaknesses. A resident may remain in this area until a thorough observation and evaluation is made. Upon the recommendation of the Unit team an individual program is constructed with emphasis in areas in which weaknesses have been observed. A brief outline of the pre-vocational training program follows:

Pre-vocational Training Program at the Greene Blind Unit

Purpose: This aspect of the program has been designed and developed to provide pre-vocational training in those areas which have been deemed necessary to insure an individual's maximum possibility for successful adjustment to job placement within a sheltered, semi-sheltered or independent setting within or out of the state institution.

The amount of training each individual may receive will be based upon his needs. Program flexibility insures opportunity for maximum growth including areas relating to overall function as an independent or semi-independent adult. Some of these areas are described briefly below:

Techniques of Daily Living

T.D.L. is a vital component in any habilitative or rehabilitative program. Mastery of self-help skills, which leads to good personal hygiene and grooming, makes the individual more acceptable to society and future vocational placement. The objectives of the T.D.L. course are to teach each resident to be clean and well groomed; to acquire good manners so that he can live with others and practice effective habits in their presence; to build up a self-image and self-identity; and also to give learning experiences for the betterment of his own being.

Self-help skills are stressed and encouraged according to the

individual's needs including ability to bathe; ability to tie one's shoes; ability to clothe oneself (zippering, buttoning, putting on stockings); ability to brush and comb hair well, ability to brush teeth effectively; ability to use deodorants; ability to eat using acceptable table manners, and of course, the use of good toilet habits.

Household Management

The household management phase of the program is devoted to the development of skills essential for successful independent living. They include cooking - the functional application of the culinary arts with the use of various modern kitchen facilities; understanding of basic tools and their application to minor home repairs; basic household chores such as cleaning, dusting, vacuuming, laundering, ironing, sewing, pouring, etc.; and basic home arrangement and decor.

Communication Skills

Communication is an essential skill which enables individuals to acquire basic knowledge about the physical and social environment. Communication includes not only the ability to understand language via the auditory sense but also the spoken and written modes. Therefore, communication must be functional and realistic with ample opportunity to foster achievement and satisfaction.

1. Controlling the volume of the voice when speaking.
2. Developing skill in facing the individual to whom one is speaking.
3. Learning to make introductions in various social situations.
4. Developing skill in use of appropriate vocabulary in specific situations such as greetings, telephone conversations, asking for information, ordering in a restaurant, handling a variety of situations concerning transportation, and responsible behavior during emergencies, etc.
5. Utilization of the tape recorder as an instructional aid.
6. Acquaintance with interviewing procedures.

Written Communication

Written communication includes a variety of media to provide each

individual with a mode of expression. Instruction stresses practical usage based upon individual abilities.

1. Braille medium-writing letters to friends and mailing procedures.
2. Care of and mailing procedures for talking books and tape recorders.
3. Writing an acceptable signature for banking and legal purposes.
4. For advanced and capable individuals, instruction is given in budgeting and in writing checks.
5. The typewriter is another medium for communication with sighted friends.
6. Written communication for business purposes including proper letter headings and envelope addressing.
7. Development of a personal communication system including addresses, telephone numbers, and memoranda.
8. For the non-braille trainee, the mode of communication is the tape recorder. (Instruction is essential in care and operation of cassette and reel recorders.)
9. Instruction in wrapping and mailing packages.

Listening and Current Events

The media for listening skills pertaining to the physical environment includes a variety of mechanical instruments: radio and television, newscasts, talking books and tapes, movies and speakers. These provide ample opportunity for individuals to know more about the physical world and the problems therein, political, social, and economic.

Concept Development

The concept development program involves development of those basic concepts essential to independent mobility and a knowledge of one's environment. A knowledge of body concepts as described by Bryant Cratty is essential for the beginning phase of this program. Terminology must be consistent and meaningful for conceptualization in a variety of experiences. These experiences can involve tactual aids such as maps, scale models, actual objects, etc.

Orientation and Mobility

The objective of the orientation and mobility program will be development of skills that will enable an individual to be a safe, efficient, independent traveler during training and in future vocational placement. Such skills include: independent travel to and from classrooms and training areas; moving safely within the classroom or training areas; negotiating special areas such as the employee's cafeteria, recreational areas, public restrooms; as well as any other situation a resident encounters during training.

The orientation and mobility program will also include sensory training: training of the tactual, auditory, kinesthetic, vestibular and olfactory senses as they pertain to independent travel; concept development: development of basic concepts essential to independent mobility and a knowledge of one's environment; and body image: awareness and knowledge of one's body and the relationship of one's self to other objects in the environment. It is apparent that the above are not only essential to orientation and mobility, but compliment the other areas of training.

All orientation and mobility training will be done on an individual basis by professional trained peripatologists. An initial evaluation will be made of each resident to determine the specific needs of the individual and a program planned accordingly.

Task Management

The main purpose of the task management phase of the program is to provide residents with a series of structured, stimulating experiences in a controlled setting. The primary goal is to foster acceptable social and personal attitudes by means of related activities which are essential to successful habilitative adjustment. The tasks themselves are of secondary importance, but are structured to provide a variety of skills necessary for further habilitative development. Various materials and equipment are utilized to provide instruction in terminology, tactile discrimination, following directions, spatial concepts, accuracy, speed and the necessity for safety precautions.

Healthy work attitudes of major concern are: (1) cooperation with authority figures and acceptance of rules and responsibilities; (2) cooperation with fellow trainees; (3) concentration,

perseverance, and pride in work completion; (4) control of unacceptable mannerisms; and (5) safety in handling materials.

Specific projects are presently being incorporated because of their utilitarian value at Fernald, such as making cotton swabs; making laundry tags; folding diapers, towels and face cloths; folding letters and inserting them into envelopes; packaging elastic bands 100 per envelope, packaging safety pins 75 per envelope, and sorting materials of various sizes and shapes.

Vocational Placement

The objective of vocational placement is to enable the individual to experience various aspects of vocational placement, allowing for the development of healthy attitudes toward on-the-job training and future employment. With the Greene Blind Unit as a focal point, it is possible to utilize numerous opportunities on the Fernald grounds for vocational training. The staff of Fernald is receptive to allowing these training opportunities to the blind and appreciate the assistance given them by trainees. At the present time, a number of residents work in various buildings on the grounds, performing essential functions similar to those done in the community. They function quite adequately in roles such as dishwashers, porters, laundry assistants and supply clerks. In these placements a member of the staff remained with the trainee until it was decided the individual could function effectively without supervision.

Opportunities for other types of employment are limited only by the capabilities of the individuals entering the program. At present, there is a list of other possibilities for job training at Fernald which will not be fully explored until trainees are capable of fulfilling the requirements. All in-service training is realistic and trainees are given experience in jobs in which it is felt they will be able to find successful employment in their home communities. For this reason it is essential that the staff of the Greene Blind Unit establish and maintain close communication with the counselors of the Commission for the Blind.

Leisure Time Activities and a Recreational Program

Since no individual devotes all of his energy to a vocation, it is apparent that he will have leisure time. What to do with this leisure time is the goal of this phase of the program. The ulti-

mate goal is to develop and foster activities which enable an individual to make better use of his leisure time during training and in the future. Included in the activities will be games and hobbies as well as exploration into other personal interests expressed by the trainees.

Field trips, while mentioned last, are equally vital to the overall success of the program. Various trips shall be planned that will provide opportunities for the trainees to participate in the cultural, social and recreational programs in the community. As well, a number of trips to shopping centers and a variety of stores will be planned to expose each individual to as much as the community has to offer during the time the trainee actively participates in the entire program.

COOPERATIVE WORK-STUDY PROGRAM

FOR THE VISUALLY HANDICAPPED

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The Portland Cooperative Work Experience Program began in 1965, State Department funded under Title I. The following summers the funding was a joint effort by the Portland Public Schools, the State Department of Education and the Oregon Commission for the Blind.

The overall objective of the Work Experience Program is the preparation of students for a responsible role in the community. It was recognized that not all of our blind students in the past had been able to become completely self-sufficient even though they were very capable persons. In doing an analysis of some of the reasons for the blind child being excluded from the world of work, we discovered that they lacked the prevocational skills necessary to seek and obtain a job. They had very little knowledge of the Work-A-Day-World and its expectations for them.

The project then is an attempt to meet these needs and provide blind high school juniors and seniors with the prevocational skills that take into account the realities of the world of work and their commitment to it. It was recognized that not all students would be able to become completely self-sufficient as a high school junior or senior but that we could begin to evaluate the student and carefully plan an experience which would lead to another step and finally help them to utilize, develop and function at their highest possible level.

Vocational training and evaluation was seen as a progression through a series of steps, beginning in the primary grades and

culminating in successful placement in an appropriate work setting following the completion of school preparation whether that work setting be a sheltered workshop or professional job. Whatever that job was to be, there were some goals we felt to be common at all educational levels and we sought to implement them:

1. Self-care
2. Interpersonal relationships
3. Positive attitude toward work
4. Development of physical abilities
5. Development of good work habits
6. Strengthening and improving the self-concept

Specific to our high school work experience:

7. Exploration and evaluation of job possibilities in the community
8. Realistic self-evaluation
9. Evaluation of work habits through classroom workshop experience
10. Investigation of service agencies and labor laws
11. Development of skill in job application
12. Job exploration through travel and visitation
13. Evaluation of jobs through contacts with community
14. Ability to handle pay, travel, and personal relationships
15. Application for a job
16. Successful employment and training

With these goals before us, our project begins the week following the termination of the regular school program. For the normal blind teenager our program begins each year with a two-week workshop in a public school. During the two weeks we do a great deal of work in skill development in typing, writing job resumes, writing letters of various natures and applications of all kinds. We role-play job interviews with real employers from the community who interact with students regarding various types of employment. We study income taxes, labor laws, take field trips to the labor bureau and get a labor permit, go to the social security commission and get a social security card, and discuss social security and its special benefits. We work out bus routes and obtain bus passes. We explore job possibilities through special visitors, field trips to industry, brain-storming, and discussion. Many discussion and role-playing experiences in punctuality, dress, grooming, responsibility, deportment, ability to get along

with other employees, and ability to adapt to job requirements are explored with the youngsters. Through our discussions, field trips and guests, we try to develop a positive attitude toward work taking into account the realities of the working world and its demands. We travel in small groups into the downtown Portland area, going to the post office, labor bureau, large department stores, colleges, and state office buildings in order to practice some of the learnings regarding bus routes, etiquette, and orientation.

As we enter into the final week of the individual student's workshop phase, the work coordinator talks over the student's self-evaluation and placement goal. Together the student and coordinator explore some ideas of places to seek work. Then the student makes arrangements to have a job interview by phone or through a letter of application, meets with the personnel man, and he is either hired or not on his own merits.

Once placed on a job the work coordinator visits frequently to discuss successes and concerns with the student and employer and to continue to survey and develop new job possibilities. An evaluation form is used and employers' evaluations and suggestions become a part of the student's final evaluations.

Concurrent with the work experience program, we hold parent discussion groups each Thursday night for the parents of work experience students and for other parents of blind children so that they can interact with professionals who deal in various areas of rehabilitation and training. Other evening meetings also bring the work experience students together for discussion of common experiences on the job and for greater exploration of the job world through the sharing of experiences. These Parent Meetings give excellent opportunities for us to help parents of young children begin working with their children at home with some of the developmental skills necessary to pre-vocational training.

An Orientation Mobility Specialist works with students along with the Coordinator in helping students develop travel routes and skill in traveling freely on bus transportation to and from work. Many students have difficult bus transfers to make in the heart of the city but with the help of the Mobility Specialist most are able to travel somewhat independently.

It is exciting to report that we have been successful in place-

ment. Despite the overload of students, all have had the opportunity to work - several students having had several jobs offered to them. Several other students worked at more than one job during the summer. Some jobs students have worked at include medical transcriber in a large hospital, as a Red Cross volunteer, as a janitor, as a lawn maintenance man, a boy setting up a project for a large department store, a girl doing packaging, a girl working in a nursery, a girl working at a food stand, a girl working as a dictaphone transcriber and office girl, a girl working as a receptionist and coat check girl, a boy working in a woodworking and cabinet shop, and a girl working at a hospital in Central Service, a boy doing typing, a girl as a nurses aide, a boy in a hospital laundry, a boy in an industrial tool crib, a boy as a farm hand, a girl in industrial assembly work, and a boy working in the telephone industry. We have been successful but through our summer program with community placement we have been able to identify certain areas that have posed problems.

1. Some students have lacked the necessary adjustment to work and stay with tasks that are monotonous and dull without complaining. Some were unrealistic about what work is. Individual counseling and group discussions were not too effective although a few changes were noted. In these cases, it has been necessary to search for individual means of motivation. Parental support and exposure to the realities of the world of work are so necessary.

2. A closely related problem was that of the self-image of the student as reflected in unrealistic job choices and lack of understanding as to what job requirements are.

3. Lack of parental support confused some students. Parent's goals were not in keeping with student's abilities and experiences at this time.

Because of the identification of these kinds of problem areas, we have moved toward a full year emphasis of work experience realizing that prevocational skills cannot be developed in a couple of summers but that we have to work intensively with a child over a long period of time. Community people have joined with us sponsoring "Charm Seminars" for girls, community field experiences and vocational classes for juniors and seniors.

We are now in a third phase of our program development which makes possible the employment of a full-time, year-round vocational coordinator to work with our visually handicapped students - individually and in groups to supplement our summer workshop, work experience programs, and academic school program. Many success stories can be told but we also know the agony and frustrations our teenagers have had to face as they have grappled with the realities of being on time to work each morning, of frustrations of mastering the time clock, of explaining their visual situation to curious co-workers, and of the realities of work - that it is hard, sometimes tiring, sometimes boring, but meaningful.

PREVOCATIONAL CONTINUUM:

A STEP TOWARD CONCEPTUALIZATION

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How can we best provide vocational programs for low vision and blind children? In light of the ongoing socioeconomic and technological revolutions in our culture, we must ask "what roles can our schools and agencies best play to provide the competencies so crucial for these children's personal satisfactions and vocational successes?" These questions are not only relevant to our field of the visually handicapped but to education in general. In essence, how do we answer them?

In the not-so-distant past, we attempted to offer in the schools the specific types of training which were considered appropriate for low vision or blind children. Our other alternative was a suitable college preparation program.

Today, distributive education and the cooperative and work-study programs have followed and sometimes replaced those two choices. These new programs have undoubtedly expanded the vocational possibilities available to the children. But, are they sufficient? They do partially alleviate the oft-heard challenge that only a few stereotyped vocations are available to the visually handicapped.

Another recent approach is the vocational exploration program. This approach may best be described as a "phase" of total vocational programming, for it will expand the horizons for the visually handicapped youth. Hopefully, this concept will make a greater variety of vocational choices available.

The well-known comments on the vocational accomplishments of the "active and intelligent blind" by Lowenfeld (1956), Bauman and

Yoder (1962), reveal that this segment of the blind population can be successful in a broad range of vocational endeavors. Might this tell us something about the vocational potential of an even greater portion of the visually handicapped population? This should challenge all of us who function in capacities tangential to this problem. It challenges our creative abilities to conceptualize and implement programs relevant to the present and future vocational needs of the visually handicapped youth.

This type of programming is so obviously needed today when vocational opportunities elude new graduates on all levels, from high schools to doctoral programs. Sound programming must attempt to mitigate the effects of vocational obsolescence which will affect many young graduates.

We educators are often guilty of assumptions that have far-reaching effects on our "finished products." In reality, we find that our greatest efforts in behalf of the students' vocational orientation and adjustment are concentrated at the high school level with little regard for preceding events or training. We must not assume that a concentrated program in the last few years of high school will provide the necessary background for realistic decision making. In many of our assumptions and short-sighted planning, little more than lip service is given to the pre-vocational needs of children. Otherwise, would there be so much criticism from agency counselors that the schools have accomplished so little in so much time?

Undoubtedly, there are curricular provisions for vocational study in the lower grades. But, are they sufficient and individualized and relevant to a changing world? For example, the newspapers recently carried excerpts from a U.S. Department of Labor report which stated that the need for teachers will be less in 1980 than in 1976 because of two million fewer children in the junior and senior high schools. If true, this is unfortunate timing because the blind are now finding the teaching profession increasingly accommodating as a successful occupation.

In view of such changes and predictions, it may be wise to look beyond the immediate cooperative and work-study programs which are generally confined to the high school age population. We might conceptualize a program which begins in the home, continues within the elementary and secondary schools, and culminates when the individual is capable of vocational decision-making with the appro-

priate agency assistance if necessary. Such a cooperative pre-vocational exploration continuum would encompass both the affective and cognitive domains.

Another faulty assumption is that the blind child's behavior can be judged in the sighted person's frame of reference. Robert Scott (1969) in *The Making of Blind Men* implied that the blind person's behavior is learned from and maintained by the sighted professionals who work with the blind. If we examine the early life and education of a visually-handicapped child, we often find that he has not had the opportunity to see or interact with the variety of vocational models that other children normally do. One is reminded that 80-90% of one's incidental learning is via the visual channel. Parents who do not receive proper help from the appropriate agencies tend to overprotect the visually handicapped child, assume he is incapable of understanding any vocational concepts, or simply fail to provide learning experiences that fill the gaps in incidental learning.

When vocational exploration formally begins later in the school programs, the visually handicapped child has no baseline of information to enable him to participate in or understand vocational discussions. Lack of comprehension of the preparation, skills and human interactions involved in an occupation often leads to unrealistic decisions. There are problems both when he chooses a vocation for which his visual impairment or other incapacities (physical, mental, etc.) prevent success, or when he is not informed of vocations which he may be able to perform if adaptations are made.

A specific example may demonstrate this problem more clearly. A 14-year-old farm boy wanted to be a farm worker after he graduated. He requested to be shown a fence post on a school field trip. How much value was the occupational information in books and discussions to the boy who lacked the experiential background and baseline of information?

Now we can ask <u>who</u> provides the vocational models to be emulated by the visually handicapped child, and <u>what</u> variety of information can be offered to him? Without assistance from competent agency or educational professionals, how can parents prepare the child so he does not enter school as "tabula rasa" in vocational orientation? The schools' responsibility in the pre-vocational preparation would vary in each state according to administrative organization. But in each school there may exist some means of

providing the vital background to prepare the child for the school's own vocational adjustment program.

In considering the interaction and responsibilities of parents, schools and agencies in preparing the visually handicapped child for realistic vocational decision making, we may begin by approaching vocational orientation and adjustment as a developmental sequence analogous to all other aspects of human growth. Ginzberg and his associates (1951) presented a format for this type of conceptualization in their theory of occupational choice. They concluded that occupational choice is a process requiring from six to ten or more years.

The "fantasy period" from age six to eleven is the first period of choice. This is a period during which a child conceives of occupations as part of a desire to be an adult, and he feels he can enter any occupation he wishes.

In the "tentative period" the adolescent begins to recognize the factors of reality such as his abilities, interests and values; he puts them in perspective when considering occupational goals. It is important, as Ginzberg points out, that each decision in adolescence is related to the individual's experiences.

The final phase, the "reality period" occurs in early adulthood. The occupational choice is a compromise reached by weighing a series of subjective elements with real opportunities and limitations. How difficult it must be to realize the final period without the information successfully to accomplish the first two.

In providing a true pre-vocational continuum, we might expand the salient periods of vocational orientation downward to the early childhood years. During this period it is necessary for the visually handicapped child to have experiences which lead to the acquisition of information, skills and learning sets comparable to his unimpaired peers. These experiences play a vital role in each of the later periods of choice. Specifically, the child is exposed to vocational concepts as he performs within the family structure and as he relates to his working parents and to other significant adults.

Some specific programs and philosophies may further explain the school's role in the "fantasy" and "tentative" periods of choice. Some residential schools for the visually handicapped are work-

ing on pre-vocation orientation in the elementary grades, a few as soon as first grade.

Thompson (1969) developed a philosophy and conception of elementary level occupational development. Included in his conception is the recognition of the "fantasy" period when a child tries out different work roles as an essential aspect of development. He considers the nature of the child's attitudes toward achievement and his interpersonal relationships important to vocational adjustment. The focus of the elementary program is on adequate experiences throughout the student's years in school enabling him to make the actual vocational decisions realistically, not necessarily any earlier than usual.

Thompson set up key objectives to follow when teachers, administrators and counselors develop the specific curriculum for career orientation. These objectives are: To help the child appreciate all kinds of work; to develop the concept of flexibility (in order to adjust to the rapid development and obsolescence of jobs); to provide a wide base of experiences for realistic, not earlier, decisions; and to stress the importance of effective use of leisure time.

The school's role in programming during the "tentative" phase of choice involves the investigation of the adolescent's interests and readiness. The school staff then provides vocational exposure and first-hand vocational exploration where the student involves himself in reality testing. For a specific program, the Portland Cooperative Work Experience Program presented by Mrs. Edwards provides an excellent format.

In the "reality" period, there is the opportunity for a school-agency merger and cooperation. Presently most schools have a member from Vocational Rehabilitation working with or within the Schools for the Blind. The new Texas State Plan for Special Education incorporates another concept which may be more applicable to public schools. The Vocational Adjustment Counselor, whose position is funded by the school and agency equally, provides vocational programs for the student during his years in the school. There is then continuity as the Vocational Rehabilitation worker begins to assist the student some time before graduation and continues this assistance after the youth leaves school.

In summary, there is much value in the different work exploration programs. They enhance the success and satisfaction of vocational choice; their ultimate goal is successful placement of the visually handicapped youth. Yet, how much greater would the success of these programs be if the child were well prepared for them?

The concept of a pre-vocational continuum is based on Tyler's (1964) conclusions about readiness as discussed in *Theories of Learning and Instruction*. He feels that "readiness depends upon appropriate stimulation and opportunity for relevant learning experiences and that practice and integration are essential to knowledge or skills." To paraphrase Tyler, readiness for vocational adjustment requires a more positive approach (to both cognitive and noncognitive readiness) and provision for "enrichment," i.e., the necessary background knowledge rather than waiting for time alone to produce this readiness.

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MOBILITY FOR YOUNG BLIND CHILDREN

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What is a mobility program at the pre-school level? Is it necessary to have a specialist in this area to operate an effective program? If such personnel are available, they may be of great assistance in planning and carrying out such a program, but I do not see them as a vital ingredient.

We are faced with a young child whose movement within his environment is impeded by a visual handicap. This child, like any other, has a natural curiosity about his environment which can be satisfied only by his own exploration. To this point, we really have no problem. Now the adult figure enters upon the scene and our real problem begins.

This adult, usually a parent, places severe limitations upon the child's movements within the environment. This action is generally motivated by fear and lack of understanding. It does not take even the very young child long to interpret the fear parents associate with freedom of movement, and thus the problem takes root.

The establishment of pre-school counseling for parents would seem to be a most obvious solution to this problem, but in many instances it has not worked as effectively in reality as it does on paper. This is often not due to the lack of advice or assistance given, --- but rather to the weight of caseloads which prevent the parent counselor from providing the frequent reinforcement necessary at this early stage of the child's development.

What is needed at the pre-school level is not a host of platitudes and set speeches on the importance of movement for the young blind child. Many parents of blind children have been subjected

to such orations on numerous occasions. The need is for concrete suggestions on activities and tasks which the parent can carry out with a minimum of disruption to the daily routine. So many parents are hesitant to try specific activities with their child for fear that it may have negative results. They need reassurance that this will not happen, along with a list of structured and well thought out activities that are compatible with the child's developmental level.

One cannot stress strongly enough this last point regarding the developmental level of the child. The point of intervention will not always come ideally at a time before a sizable developmental lag has been experienced. For this reason, one must look closely at the types of activities and tasks that are suggested for a particular child. A task which presupposes a complex conceptual framework must not be introduced until the basic foundation has been laid. This latter point may seem almost too obvious to warrant mention, but time and again we see tasks being introduced that far surpass the child's developmental capability. Frustration for child and parent can be the only result of such efforts.

It is important that we carefully ascertain the conceptual components of any task or activity and begin where the child is developmentally --- not chronologically.

Let us not deceive ourselves with the notion that a list of suggested activities will solve this complex problem. All that such a list can hope to provide are suggestions to the parent. The constant reassurance which parents will need must be provided through frequent contact with the pre-school counselor who will, hopefully, investigate all possible resources.

The presentation of this material should go far beyond the area that has so narrowly been defined as orientation and mobility. The child's development at this stage will affect his total learning pattern. Some parents may already have conjured up a sterotype of the blind individual using the long cane and possibly harbor strong feelings about preventing anyone from placing so symbolic a tool in the hands of their child. Still other parents look upon the cane as a "magic wand" that will lead their child about, thus seeing little need for preliminary instruction before the child is enrolled in a formal program of orientation and mobility.

To stress the connection between this work in the area of conceptual development and the child's eventual success as a user of the long cane may, in some cases, only serve to defeat one's purpose. It is important that we are sensitive to the feelings of the parents of this young blind child, who will probably find it extremely distasteful to envision their four year old eventually traveling with the assistance of such a mobility aid. Their feelings will certainly undergo many changes over the years as their child grows and develops, thus providing them with a more realistic representation of himself as an independent individual.

If the pre-school counselor is to assist the blind child and his parents in planning a program that will enhance the child's conceptual development, she must do much more than merely introduce the material in a manner that does not threaten the parents. She must be intimately familiar with early childhood development so that she is able to ascertain, through observation, a developmental profile of the child that will indicate the strengths and weaknesse of the child's conceptual and sensory motor development, so that efforts may begin where the child is developmentally. She must be capable of imparting to the parents the information which she has ascertained from careful and frequent observations.

Many parents attempt to introduce activities that the blind child's siblings were capable of performing at the same chronological age, with seemingly blatant disregard for a developmental stage that has been passed over. Anxiety can easily arise from the child's failure to meet these expectations --- feelings that are sure to be transmitted to the child, thus further impeding progress.

The parent counselor should not try to carry the full weight of such a program and would be well advised to look to the community resources for the assistance that might be needed. The family pediatrician, or a local nursery school program may be of great assistance if approached in the proper manner.

Every effort must be made to involve the family members and peers of the young blind child in these activities that will assist his conceptual and sensory motor development. The sequence of activities should follow a natural progression and make use of what is available within the child's environment, whether this

be the screeching sound of a nearby metropolitan subway system, or the monotonous hum of the power mower so familiar to today's suburbia.

A list of expensive educational toys will send most concerned parents scurrying to the nearest local franchise of "creative playthings," and although such equipment may be of assistance, human involvement is the vital ingredient that we must develop.

Once those individuals working with the child understand the scope and objectives of such a program, a host of useful environmental stimuli will become self-evident. The utensils found in almost any kitchen can be a real find for the curious child who will find endless uses for the colander, measuring cup and rolling pin.

The rolling pin, for example, can be used to introduce the child to the concepts of "push" and "pull," "forward" and "backward," etc. The drawer or cabinet that houses this utensil can be used to bring across many of the same concepts. There is much to be said for the use of such common everyday materials, since the child will also learn about their more common and utilitarian functions.

Each child follows a basic developmental pattern that requires physical and conceptual growth before the child can successfully move onto the next developmental stage. The young child will progress at varying rates in particular developmental areas. His gross motor coordination may be at one level while his manual dexterity requiring finer motor coordination may be at another stage on the developmental scale. For this reason the skills and activities which we introduce must challenge a particular aspect of the developmental profile but not surpass it to the point where such an activity frustrates and thwarts growth. Parents must understand their child's developmental profile so that they can provide the type of learning situations that most adequately meet his needs.

It has been common practice for many years to expose parents to certain growth and development characteristics that are neatly divided by stages such as "the troublesome two's" or the "terrible three's." These broad categories may serve a useful purpose to the parents of the "normal" child, but we should make the parent aware of the many ways in which a visual handicap can interfere

with the normal developmental pattern --- thus providing a more erratic developmental profile.

A child's gross motor coordination, which is vital to gait and mobility, may appear far below the norm, while manual dexterity may have progressed in a more satisfactory manner. Such inconsistency in the developmental profile may be found in a child who has developed good manual dexterity while playing with toys and puzzles. But if all such learning takes place within the confines of the playpen, little has been done to assist the child with development of the gross motor coordination so necessary for creeping and walking.

One of the major failings of much of the material written about the pre-school child has been use of educational jargon. Such material should be simply written, using no more than a high school level vocabulary. To present such material with brevity and clarity is a challenge but will pay great dividends in the long run.

It is also of utmost importance that professionals in the area of educating visually handicapped children not add more complexity to this problem than already exists. In many instances we do not have to look far to find persons who have a basic knowledge of young children and how they learn and grow, who can provide the type of assistance that a particular child needs. Perhaps they have had no formal training in the area of education of the visually handicapped, but in certain instances this lack of formal training may be to their advantage.

Many of you may remember Bambi Lynn, the television choreographer and dancer who appeared on numerous television variety shows during the mid 1950's. Since then she has retired to a career of private dance instruction in a town in southern Connecticut. She is a most charming and creative individual who has undertaken a project that involves a group of 6 - 8 young visually handicapped children. She provides free instruction to these children once a week, and despite the fact that she holds none of the treasured degrees and certificates she does some very inspiring work with this group. She has a real understanding and feeling for these children which stems from her creative and artistic talent, and a basic understanding of children.

As professional persons we have an obligation to look at such programs with a critical eye, to discourage what is unhealthy for the blind child and to encourage that which is effective, even when it exists outside of the territorial limits of our profession.

ORIENTATION AND MOBILITY RESEARCH AT CALIFORNIA STATE COLLEGE, LOS ANGELES

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Education, by public demand, is moving into an era of accountability. Regardless of our personal feelings, we are obliged to produce evidence of money well-spent before we can hope to justify pleas for greater support. Research, a tool for solving problems, can and must be used to produce evidence of effective teaching not only for our employers but also for our consumers and certainly for ourselves as professionals.

Assessment of Orientation and Mobility Skills

Background

From June, 1964 to August, 1968, Francis E. Lord, Director of the Special Education Center at Cal State, L.A., undertook four projects related to orientation and mobility for blind children. Two of them were supported, in part, with demonstration grants from the Vocational Rehabilitation Administration.

Demonstration training projects: Major purposes of these projects were to confirm the need for orientation and mobility training for blind children and youth in Los Angeles County (Lord, Blaha, & Manshardt, 1965) and to demonstrate that such instruction could be effectively provided for blind adolescents (Lord & Blaha, 1968). Effects of the projects have been summarized:

1. With specialized instruction, 51 blind adolescents acquired independent travel skills with varying degrees of proficiency. Subject variables appeared to be motor development, experience with the environment,

motivation, psychosocial adjustment patterns, and parental attitude. Situational and instructor variables were also operating.

2. Specialized instruction was demonstrated to be desirable and necessary. Trainees and their teachers reported gains in independence and positive self-concept. Parents indicated willingness to pay for the service. Certification was established by the California State Board of Education so that instructors could be employed by school districts. The college assumed partial support of the graduate training program.

3. Teacher-participants, while effective in teaching some of the pre-cane skills, were restricted by already full schedules.

4. Problems encountered evoked numerous questions from the project staff. Was adolescence, with its inherent complexities, an ideal time for intensive instruction in orientation and mobility or should instruction be continuous from early childhood and tailored to needs of the maturing individual? What constitutes readiness for instruction? How can it be developed and assessed? How might limiting factors of home, school, and community environments be modified to increase motivation for acquiring and using independent travel skills? What should be the role of specialist, teacher, and parent?

Concurrently, Lord (1967, 1969; Lord, Manshardt, Adams, & Bailey, 1966) investigated orientation and mobility skills of young blind children and developed an instrument to assess them. The United States Office of Education made research grants toward support of the project.

Identification of Skills

Framework. The framework for the entire project was provided by Havighurst (1952) who theorized that life is a long series of tasks to be accomplished.

2

> A developmental task is a task which arises at or about a certain period in the life of an individual, successful achievement of which leads to his happiness and to success with later tasks, while failure leads to unhappiness in the individual, disapproval by the society, and difficulty with later tasks (p.2).

Basic assumptions were: (a) the sequence of developmental tasks for blind children is essentially comparable to that for seeing children, (b) development of skills in orientation and mobility is a part of a blind child's early school experience, and (c) these skills can be identified and assessed.

Objectives. Primary objectives for the first phase of the project included the identification of developmental tasks relating to the young child's interaction with the physical environment, a description of the orientation and mobility skills required for achievement of these tasks, and identification of related learnings essential to their performance.

Procedure. The project staff made a comprehensive review of the literature on child development, blind children, sensory and perceptual aspects of orientation and mobility, measurement of motor skills and social competencies, and pertinent curriculum materials. Another important source of information came from observations of teachers. Over a 2-week period, six experienced teachers of blind children recorded skills and deficiencies exhibited by the children as they interacted with their environments.

Data were organized by listing age-typical behaviors in one column and the orientation and mobility skills implied by each in an opposing column. The staff employed the term *developmental referent* to designate the relationship. For example: at approximately three years of age, the child can ascend stairs, alternating the forward foot. The mobility skill implied by this developmental referent was stated similarly. A child of five or six can recognize specified landmarks. Use of stable, familiar features of the environment for orientation was suggested as appropriate expectation for a blind child. Skills so identified and organized formed a pool from which the scale items were drawn.

Construction of the Scales

The task of constructing an instrument to assess performance required that each item describe and define a specific behavior. The developmental framework required that items on each aspect of development be sequenced in one of three dimensions: prerequisite skills, reduction of assistance, or increased complexity.

Preliminary editions. The first edition of the scales, incorporating 288 items arranged in 58 sub-scales, was submitted to a jury of child development specialists, orientation and mobility specialists, and experienced teachers of blind children. Independently, the nine judges ranked each item for significance and indicated from a randomized presentation of items in each sub-scale an appropriate developmental sequence. Results guided revision and preparation of the scales for trial with 12 children.

The field trial was conducted by two examiners using a rudimentary manual and a kit of tentative test materials. This experience, along with jury judgment, provided information for further revision and the compilation of the experimental edition.

Experimental edition. During the second phase of the project, the staff achieved the following objectives: (a) revision of the preliminary draft of the scales, (b) preparation of a detailed examiner's manual, and (c) collection of reliability and normative data. Revision produced an experimental edition of 124 items arranged in 26 sub-scales related to movement in space, self-help, sensory cues, directions and turns, or formal precane techniques such as use of a sighted guide and trailing. A psychometrist was employed and trained by the project staff for the role of field examiner.

The norming sample is 173 children, ages three to twelve, from the major regions of the United States. The sample was representative of children enrolled in educational programs for the blind for sex ratio, type of program, and age-level frequency distribution. All subjects were totally blind or had light perception only. Age of onset was before the third year. None was retarded. Children with additional physical handicaps or emotional problems which might have interfered with their participation were excluded. The sub-sample of 41 subjects used in the reliability study resembled the total sample except for type of program and geographic region.

An item passed by 14 to 80 percent of the subjects in at least one age group met the criterion of minimal effectiveness. Items too difficult and too easy were thus eliminated, leaving 82 items for which tentative age norms were computed. Further refinement based on reliability data and consideration of construct validity resulted in the selection of the most effective items for the Short Form. Less discriminating items were preserved as instructional guides.

Short Form

Though the 24 Items of the Short Form were arranged in three categories, no attempt was made to sequence them into unidimensional sub-scales. The following material was reproduced from the final report (Lord, 1967).

DIRECTIONS AND TURNS

1. Responds correctly to a command to turn left
2. Correctly describes a familiar route in terms of right and left turns
3. Points out cardinal directions in a familiar setting
4. Travels a route with one turn described in terms of cardinal directions

MOVEMENT IN SPACE

5. Points toes in direction of travel while walking
6. Walks with relaxed gait
7. Walks up steps alternating forward foot, one foot per tread
8. Walks down steps, alternating forward foot, one foot per tread
9. Hops on one foot
10. Hops, alternating feet
11. Gallops
12. Skips
13. Runs freely by himself
14. Jumps off low wall or bench
15. Jumps, coordinating other body movements

SELF HELP

16. Demonstrates working parts of doors
17. Uses key to lock and unlock doors
18. Puts on sweater unassisted
19. Buttons sweater
20. Puts on sweater unassisted when one sleeve has been turned inside out
21. Puts on belt and fastens buckle correctly
22. Dials telephone numbers succcessfully
23. Identifies simple tools
24. Uses helping hand efficiently [pp. E2-E6]

Characteristics. When results for all age groups were combined, test-retest reliability coefficients were >.90. The index of internal consistency for the majority of items was >.70. Correlation of scores with age was moderately high (r = .69). Comparison of scores of totally blind subjects with scores of light perception subjects revealed significant differences between the two groups on 10 items. Differences favored the totally blind on the two items requiring use of cardinal directions and on the two items relating to doors. Performance of children with light perception was better on seven of the locomotor items. Boys in the total sample demonstrated significantly superior performance on demonstrating the working parts of doors, while girls were significantly better on left and right turns, skipping, and buttoning.

Discussion

Conclusions on the value of the scales for measurement are premature. One serious deterrent is the problem of comparable settings for administration. Another relates to the criterion for internal consistency, for a high index suggests global ability. If valid items were eliminated on this standard, skill in orientation and mobility reflects multiple abilities. Possibilities for research are numerous.

Implications for Teachers and Specialists

Teachers of blind children and orientation and mobility specialists and those responsible for guiding their preparation must cooperate in the development of this vital area of curriculum. The tendency toward polarization can only defeat our mutual

purpose of teaching blind kids to function efficiently and independently. Perhaps a search for professional identity has obscured for the specialists the fact that they are basically teachers who profess a specialization, not a separate discipline. Orientation and mobility specialists frequently complain that their trainees lack basic concepts of the environment. Teachers, on the other hand, retort that these concepts are thoroughly developed in other areas of the curriculum. Many selections from the literature advise reassuringly that readiness for orientation and mobility instruction need not be planned or structured; opportunity for normal, every-day experience is sufficient. Such statements are gross over-simplifications of the problem.

With the help of specialists, teachers can broaden their knowledge of basic concepts of size, shape, and perceptions of space as they relate to independent travel and teach for transfer. Teachers can help specialists to recognize that the content of orientation and mobility instruction includes more than a particular collection of techniques and that the necessary matrix of experience is not acquired by most children through incidental learning.

Probably the most valuable contribution of the research at Cal State, L.A. was the identification of orientation and mobility skills and their developmental referents. Since they were defined behaviorally and sequenced developmentally, they are recommended as instructional objectives. Progress toward achievement can thus be quantified and stand as evidence of teaching.

In conclusion, I submit that every teacher teaches orientation and mobility in the same sense that every teacher teaches reading. As teachers, all of us must improve our skills in the identification and manipulation of those elements of each child's environment which motivate and reward his behavior. We must record and measure changes in the child's behavior, for then we can infer that learning has occurred. We are accountable.

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THE PERCEPTUAL BASIS FOR MOBILITY

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The ability to travel safely, comfortably, gracefully, and independently, referred to hereafter by the single term "mobility," is a factor of primary importance in the life of a blind individual. The blind person who fails to acquire this ability usually displays a life style characterized by passive acquiescence to conditions proposed and arranged by others. The blind person who has acquired this ability often displays a life style characterized by the execution of plans of his own formulation. Yet, until recent years, it was not generally recognized that mobility could be resolved into a collection of related sub-skills, and that these skills could be taught.

Dr. Richard Hoover's success in working with blinded war veterans is well known. From that beginning, fairly elaborate training programs have been developed for both trainees and trainers. The success of these programs is beyond question. Many blind persons have been emancipated from lives of passive dependence.

Although the effort to state practical training objectives, and to provide experiences which conduce to the realization of those objectives, has been rewarded with significant success, we still lack a general theory of mobility to guide us in the refinement of training methods and the design of information gathering instruments intended to assist mobility. There is much to be learned before such a theory can be formulated and tested. We must learn how to measure significant aspects of the total mobility performance in order to gauge the contribution of a wide variety of factors to that performance. Dr. Alfred Leonard, of Nottingham University, has made an impressive beginning in this regard. We must assess more effectively those conflicts in personal objectives that sometimes keep a seemingly capable indi-

vidual from achieving satisfactory mobility. But first, we must arrive at a clearer statement of the perceptual operations, both sensory and motor, that underlie successful mobility. It is knowledge of this sort that will tell us what to train for when we train, and what information to display with the mobility aids we construct.

In order to understand better the task that confronts the blind pedestrian, making his way through an obstacle filled environment without primary reliance upon another individual, it may be instructive to compare his task with the task of a sighted person similarly engaged. When an individual walks, it is usually safe to assume that he has an objective; that he is going somewhere. In order to achieve this objective, he must make a succession of decisions about alternative courses of action, and to make these decisions, he must collect information. The sighted pedestrian easily obtains much more information than he needs to plot a successful course.

When the blind pedestrian negotiates an unfamiliar environment for the first time, it is quite unlikely that he will obtain enough information to plot a successful course on a second occasion. He must typically follow a given path many times in order to accumulate the information he needs in order to traverse it with comfort, speed, grace, and safety. Even when he has reached this level of mastery, the picture of the sector of the environment in which he is interested, that he can construct with the information he has accumulated, will be an impoverished picture, lacking much of the detail of the picture than can be constructed with the information obtained by the sighted pedestrian after a single contact with this environment.

Consider the following example. A blind pedestrian is walking along a city sidewalk. He is on his way to work, and he is following a course that he has followed repeatedly in the past. As he walks along, the feel of the ground under his feet gives him information which he can compare with stored information about the surface underfoot. This information might consist of observations of the following sort. The walk is constructed of brick. At this instant, it dips to form a slight trough. Immediately following, it rises above the normal level of the walk to form a small mound. Now it changes from brick to concrete construction, and a moderate downward slope sets in. If these observations match stored observations regarding the surface, the blind pedes-

trian knows that he is on course. He may, of course, receive stimulation from other senses from which he can obtain the information that he is on course. Let us suppose that his course takes him by a building that is immediately adjacent to the sidewalk. As he passes the building, he recognizes the familiar feel of the warm, moist stream of air from the exhaust fan of the laundry inside. A little further down the walk, he hears reflected sounds which inform him that a large object, that he knows from previous examination to be a tree, is to his right on the strip of ground that separates the sidewalk from the street.

The stimulation so far discussed has served to inform the blind pedestrian that he is on course. However, it is quite likely that at some point in transit, he will deviate from his intended course. When he does, he may receive stimulation containing information that does not match any of his stored information about the course, in which case he knows that he has departed from the course and that a correction must be made. To continue with the example, suppose he has been walking for some time without any indication that he is off course. The surface underfoot is hard, smooth, and level, as it should be, and he experiences no unusual smells or sounds. All of a sudden, he is brought up short by abrupt contact with an object which he determines, through rapid haptic investigation, to be a parked car. He now knows that he has departed from his intended course, and that he must make a correction. Because of past experience, he also knows that his error consisted of deviating slightly to the right, which caused him to enter the parking area of the filling station adjacent to the sidewalk. This parking area is smoothly paved with concrete, and its surface is continuous with the surface of the sidewalk. Consequently, he experienced no change in stimulation as he passed from the walk to the parking area. There may have been some auditory stimulation from which he could have obtained the information that he was abreast of the filling station, but the street to the left of the sidewalk is usually filled with traffic at this point, and its sound masks any other sounds that might serve as course indicators. However, because he has made this mistake before, he now analyzes the situation and knows what correction to make. He turns to his left and walks until his feet inform him of the sloping apron of the filling station's driveway. He then turns to the right, follows this apron until the walk levels out again at the boundary of the filling station, and he resumes his course along the sidewalk.

The first time he passed this way, he did not know about the filling station. On that occasion, he also deviated to the right and ran into a parked car. The collision informed him that he had departed from his course and that a correction was required but, because he lacked prior relevant experience, he did not know what correction to make.

There are a few important points to be gathered from the foregoing example. During the exhibition, the blind pedestrian obtains two kinds of feedback or system-regulating information; information that tells him that he is on course, and information that tells him he is off course. If he is off course, he may obtain information which specifies only that he is off course, or he may obtain information which also specifies the kind of correction required to bring him on course again. The informational value of the stimulation he experiences in course will depend, to a significant degree, upon prior experience with that course. The blind pedestrian cannot, during a single transit, obtain enough information from ongoing stimulation to specify his environment in sufficient detail so that he can plot a successful course, and he must therefore rely upon stored information. His memorial representation of the situation is, of course, affected by all of the errors that arise from imperfect initial stimulus registration, faulty perception, and forgetting.

According to the analysis just given, the blind pedestrian would have to depend heavily upon learning and memory in his exercise of mobility. He would perform poorly in unfamiliar situations, since he would lack the information needed to guide his performance. Performance meeting the criteria of successful mobility would come only after repeated trials on a given course. Fortunately, this dependence is substantially reduced by the redundancy in man-made environments. In the typical cityscape, for instance, certain features are repeated over and over again. On either side of the typical street, and running parallel to it, there is a sidewalk. This sidewalk is usually raised slightly above the level of the street. Frequently, but not always, there is a strip of unpaved earth between the sidewalk and the street. This strip is often planted in grass, and ranged along it, one will generally find trees, utility poles, sign posts, etc. The change from sidewalk to street level usually takes place abruptly, forming a step. The center of a street is almost always its highest elevation, and it slopes downward from the center, on each side, to the gutter. Buildings are usually arranged in rows

in each side of a street, with the sidewalk interposed between buildings and street. In a commercial area, there is often no space between buildings, and they are frequently immediately adjacent to the sidewalk. In a residential area, buildings are usually set back from the sidewalk, and separated from each other. Other repeated arrangements could easily be mentioned.

The significance of this fact for the blind pedestrian is that when he finds himself in a situation with which he has not had previous experience, he nevertheless knows something about it. His information consists, in this case, of predictions of stimulation that he can expect to experience. It is, for instance, more likely that the sidewalk will be at a different level than the street, than that it will be separated from the street by a strip of unpaved earth. His willingness to treat a predicted state of nature as if it were an actual state of nature will depend not only upon his estimate of the probability associated with it, but also upon the attendant risks.

Consider, for instance, a blind pedestrian walking along a sidewalk in a busy, downtown area. There is so much traffic noise that he cannot learn much about his situation by listening. He must depend primarily upon his ability to obtain surface information. He wants to continue walking until he reaches the curb, and there to stop in order to collect the information he needs in order to decide when to cross. However, he also knows that although the boundary between street and sidewalk is almost always marked by a curb, at some downtown street intersections, there is no boundary that can be discovered by the feel of the surface underfoot. If he decides to act as if the predicted state of nature is the actual state of nature, the probability is small that he will not detect the street boundary. However, if he does not detect it, he may place himself in danger by walking into the stream of traffic. If he elects not to accept the risk, then he must consider alternative actions.

In the discussion so far, little mention has been made of the role played by sensory aids such as canes or electronic environmental sensing devices. Such devices will be useful to the extent that they enable their users to obtain additional information, relevant to the task at hand, and at a rate fast enough so that the attempt to use the additional information does not retard performance. The cane, for instance, when properly used, enables the blind pedestrian to extend the range within which

surface information can be obtained. It also scans the space in front of him for obstacles. However, none of the mechanical or electronic sensory aids to the mobility process now known will so enrich the supply of information that the blind pedestrian can base his course decisions on contemporary information. Consequently, although a sensory aid may make it possible to obtain information that is unquestionably helpful, its use does not alter the situation enough to render the present analysis inappropriate.

The value of the sort of analysis attempted here, if it is valid, is that it suggests the questions which need to be answered in order to gain a better understanding of the mobility process. Increased explication of the mobility process should, in turn, make it possible to devise more efficient training methods, construct better mobility aids, and evaluate existing mobility aids more effectively. Here are some of the questions that might be examined experimentally.

1. What information is obtained by the sighted pedestrian that is relevant to the task of mobility? What are the sighted pedestrian's minimal informational requirements in relation to this task? How much redundance is there in the information he obtains, and how useful is this redundancy? Does he depend exclusively on the information present in visual stimulation? If not, what other kinds of stimulation does he process, and what is the relative importance of the information present to non-visual stimulation?

2. What information is there in the stimulation obtained by the blind pedestrian that is relevant to the mobility process? To what extent is the environment specified by the information available to the blind pedestrian? What are the relative contributions of auditory, haptic, and proprioceptive stimulation?

   How do blind and sighted pedestrians differ with respect to the involvement of memory in the mobility task? What distortions and deletions are present in a memorial representation of those aspects of the environment of significance to the pedestrian? How does a memorial representation based upon information obtained on a single occasion by a sighted pedestrian compare with a memorial representation based upon information obtained

on many different occasions by a blind pedestrian?

3. To what extent do blind and sighted pedestrians differ with respect to their reliance upon environmental redundancy? What probabilities does the blind pedestrian attach to his predictions of the features of unexperienced environments? How do these estimates of probability affect his performance? What personal and situational variables influence estimates of probability and risk?

4. When the informational requirements for mobility without vision are known, it will be possible to undertake more sophisticated evaluation of devices to be used by the blind pedestrian for the purpose of obtaining environmental information relevant to the mobility task. A sensory aid either increases the discriminability of stimulation already processed by the individual in his search for information, or supplements this stimulation with additional stimulation. If its role is supplementary, it provides stimulation that is either immediately useful because it is like stimulation the individual can presently interpret, or not useful without perceptual learning, because it is unlike previously experienced stimulation. Which kind of sensory aid should be constructed will depend, in part, upon answers to the questions revealed by this classification. To what extent will the blind pedestrian be assisted by increasing the discriminability of stimulation he is already processing? How much more of his environment can be specified by enriching the supply of stimulation that is interpretable without further learning? If significant features of the environment are to be specified by stimulation that is initially meaningless, how much learning will be required before it can be processed at a useful rate?

5. The need for an answer to this last question is immediate and urgent. Sensory aids have been constructed which confront their intended users with stimulation that is initially meaningless. These devices have achieved only very limited usefulness, in spite of the fact that, in many cases, individuals were given what was judged to be intensive and prolonged training in their use.

The Kay Sonic Aid is a case in point. This device emits a narrowly focused beam of ultrasonic energy. When this beam strikes an object, some of the reflected energy returns to the Sonic Aid, where it is sensed and transposed to the audible spectrum. The audible signal contains information about the distance separating the Sonic Aid and the object at which it is aimed and, to some extent, information about the surface characteristics of that object. There is no information in the signal regarding the direction of sensed objects in relation to the Sonic Aid. However, since its beam subtends a fairly small angle, it must be aimed at an object in order to detect it, and the aiming response of the person holding the Sonic Aid produces proprioceptive stimulation which contains directional information.

Although the user of the Sonic Aid may require some training in order to obtain that proprioceptive stimulation, once obtained, it is immediately interpretable. The user has received practice in the interpretation of such stimulation since infancy. The situation is quite different with respect to the stimulation produced by the Sonic Aid itself. This stimulation is initially novel, and the information it contains does not specify distance and surface quality in the way in which they are normally specified. Under normal observing conditions, as a sound source is moved closer to or farther from the observer, the change in the location of the sound source appears to be directly perceived. The change appears to take place in the distal stimulus. Actually, of course, it is the change in the proximal stimulus that informs the observer about the change in the location of the sound source, but the inference about the distal stimulus is unconscious and immediate. However, when estimates of distance, and of change in distance are based on the stimulation provided by the Sonic Aid, it is the proximal stimulus that is experienced. The observer is aware of noting its significant features and of inferring the state of the distal stimulus that would be responsible for a proximal stimulus so constituted. This process requires time, and the result is that the rate at which information is obtained is too slow to provide the information needed to regulate mobility at a normal walking speed.

This state of affairs poses significant questions for researchers. Can any training experience be devised, the effect of which will be to transform the perception of the proximal stimulus, produced by the Sonic Aid or other similar devices, to the perception of the distal stimulus? If so, is the amount of training required practical, in consideration of the imposition that training makes on the lives of human beings? Is this an instance in which training, if it is to be effective, must be undertaken at an early developmental stage in the life of the individual?

6. Experience with the Sonic Aid raises additional questions that are likely to arise in connection with other sensory aids. Even after prolonged experience with the Sonic Aid, its signal is often ambiguous. Is this ambiguity the result of insufficient information in the stimulus to clarify further the state of nature assessed by the Sonic Aid? Is the ambiguity due to a failure on the part of the observer to perceive significant features of the stimulus? If so, how much additional learning will be required to make those features apparent?

Conclusion

An effort has been made to indicate many of the factors that would have to be taken into account in stating a theory of mobility, and some questions, amenable to experimental examination, were asked. The analysis of the task of mobility that was attempted, suggests a model in which the blind pedestrian's progress toward his objective is regulated by contemporary information and by stored information. Before this conception can achieve the status of a theory, however, research must be performed that will support a clearer statement of the amount and kind of information that can be collected by the blind pedestrian's available perceptual systems, and the cognitive strategies available to him in obtaining and utilizing this information.

PIONEERING WITH TIME-SHARING COMPUTER SERVICE AT PERKINS SCHOOL FOR THE BLIND

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Back in 1966, Dr. Edward J. Waterhouse, Director of Perkins School for the Blind, in speaking to our students in morning assembly, predicted that probably within ten years, Perkins would have a direct connection with a large computer and would be making extensive use of its service. He went on to suggest that very likely our business office would be applying this computer to some of its practices, that the principal's office would be finding it useful in matters of scheduling, and that, above all, our students would be using it freely in connection with some of their studies in the classroom.

Little did Dr. Waterhouse realize in 1966 what an accurate prophet he was. Early in 1969, a bare three years after the prediction, Perkins had a time-sharing connection with General Electric's Mark I Computer 265 through two teletype terminals stationed beneath our new Research Library. Here, two of our mathematics teachers and twelve of our senior high school students are learning not only how to program for the computer, but also how to present their programs directly to the computer and to interpret responses from it.

To understand the significance of these two computer terminals at Perkins, we must return for a moment to the prediction of 1966. When Dr. Waterhouse made his prediction, he was reflecting a growing awareness of the rapidly increasing importance of the computer in all phases of our economic and social life, including education. We were reading in newspapers and journals of the rapid invasion of business and industry by the computer. We were attending conferences and workshops where the application of the

computer to scheduling in large school systems was being demonstrated and where the use of the computer in the classroom was even being promoted. Above all, we were learning that large numbers of blind people were finding highly remunerative employment as computer programmers.

When early in 1968, therefore, Mr. John Watt of General Electric Company approached us with a view to tying Perkins into General Electric's 265 Computer on a Mark I time-sharing basis on their new educational and rehabilitation program, he found us in a receptive mood. Although we had been learning a good deal about the use and spread of the computer in a general way, we found ourselves to be complete novices when it came to applying a computer time-sharing program to our own particular needs. Before we could commit ourselves to the rather heavy financial investment involved in this computer service, we had to establish some rather clear-cut justifications either in terms of educational values to our students or in terms of time and money-saving practices in other operations of the school, or both.

Establishing these justifications stimulated a good deal of careful thought, some inquiries into the workings of established programs, and not a little debate among a number of us. In the end, we arrived at certain conclusions which led us to accept the time-sharing service being offered by General Electric.

In the first place and, perhaps on the negative side, we could not find any immediate application of the computer service to expedite the processes in our business office; nor could we find any way immediately to use the computer to assist our principal in the many involved and complicated scheduling patterns in his office. We do recognize, however, that this present failure may be due more to our own unfamiliarity with the use of the computer and its versatility than to inappropriateness for our school operation. Indeed, we did anticipate an application of this time-sharing service to statistical processes in research in our Psychology and Guidance Department. Subsequently, our students carried out a rather useful set of exercises on the computer helping with the validation of the new Perkins-Binet Intelligence Test. As time and experience advance, we may well discover many fruitful applications of computer time-saving service to a variety of operations concerned with running our school.

Secondly, we concluded that this computer plan offered considerable promise as a tool in the classroom of some of the subject areas in our senior high school department. We felt that the application of the computer to classes in mathematics and science would be particularly effective both as a means of greater efficiency in the learning process and also as a means of motivating our students to greater interest and effort.

Finally, since it had already been well demonstrated that blind people can be highly successful vocationally as computer programmers, we concluded that we should give our students experience on the computer with a view to exploring both vocational interests and vocational aptitude.

In November of 1968, bearing in mind the conclusions enumerated above, Perkins signed a contract with General Electric Company for computer time-sharing service and a contract with the Telephone Company for service of two teletype consoles, and we were in business.

Almost at once, of course, as might be expected, problems began to arise. Just about every student in our Upper School wanted to get his hands on the computer. Class schedules for the school year 1968-1969 had been set long before and were not easily altered to allow for the effective use of the new tool. Compromises were necessary to glean the greatest value from the computer during the remainder of the school year. Two groups of six students each from the mathematics department were selected. Two of our mathematics teachers offered each group an evening of their time for computer work, and our principal found an additional period of time for each group during the classroom week. This gave us a nucleus of twelve students who could share active experience on the computer during two periods each week and who could do additional preparation work for the computer during other mathematics classes and during study hall periods.

A second problem area became identified in the fact that our mathematics teachers, although well equipped with the general mathematical background necessary for successful computer operation, had not been trained in the use of the computer itself much less in the techniques of teaching the use of the computer. Mr. Robert Streight of the General Electric Educational Staff took this problem in hand and offered our teachers guidance and instructional time at the General Electric Educational Installation, in Wellesley, Massachusetts. He also provided our teachers with the

necessary manuals and supplementary exercise material which our teachers could use with our students. With these aids, together with a considerable amount of imaginative planning on their part, the teachers have been able to present our students with a program of instruction using the computer which appears to be of merit. At least our students have been able to unravel involved mathematical problems using the computer. They have been able to construct programs, they have been able to operate the machinery, and they have displayed a great deal of enthusiasm.

Perhaps a more serious problem in using the computer at Perkins arises from our present failure to have a Braille Printout for our blind students to use. This means our blind students must depend upon the eyes of their teachers to read back to them the information that comes from the computer. Only in one or two cases do the students have enough vision to read the print characters. This in our minds, of course, is a serious flaw as far as our computer program is concerned. The lack of Braille Printout, in fact, almost caused us to postpone our venture into computer programming in the very beginning. Mr. Watt indicated to us, however, that General Electric was working hard to devise a system of providing Braille Printout and hoped to have a satisfactory system shortly. In fact, he showed us a metal thimble-like attachment to be placed on the teletype machine which would produce a tape of Grade I Braille. Subsequent tests for this thimble, however, produced Braille of such a poor quality that it was not usable.

For a time, it appeared as if our computer training program would be doomed to complete inadequacy before it was begun for the lack of a Braille means to make our students completely independent in the use of the machinery.

At this point, it seemed clear to us that we had a choice of alternate courses of action. Either we must drop this experiment in the use of the computer with our blind students or we must take the initiative ourselves in a true pioneering spirit and organize the resources necessary to provide us with a Braille Printout for our blind students. Rarely has Perkins sidestepped the issue when a pioneering effort was found necessary. This case was no exception.

First of all, we decided we needed working with us a highly trained technical expert in this field of computer operation.

Mr. Robert Gildea, Systems Analyst for the MITRE Corporation, a blind man himself and highly successful in his field, seemed a logical choice, offered himself, and has become our consultant. Mr. Gildea was able very skillfully to review with us possible solutions to the securing of a Braille Printout on our time-sharing plan with General Electric. Under his guidance and with the help of a number of other technical experts in this field, we decided to support two separate systems proposed to provide us with a Braille Printout. The first of these is the system being developed by the Sensory Aids Division, Evaluation and Development Center, Massachusetts Institute of Technology under Mr. Vito Proscia. The second is that of Mr. Ray Morrison, recently retired from the Telephone Company, who has ingeniously adapted several pieces of equipment to produce a Braille Printout on a time-sharing type of equipment we have at Perkins. The MIT System, although rather expensive to duplicate, has the advantage of being funded from Federal sources which promises us at Perkins rather inexpensive operation at least during an experimental period of time. Mr. Morrison's System, on the other hand, must be funded privately, and Perkins has made a sizable financial contribution to this end. At the present writing, the MIT System would provide the blind operator with a printout in the form of a sheet of Braille which would be rather easy for him to control. Mr. Morrison's printout, at the present time, however, would be in the form of a tape which has some disadvantages in terms of handling and storage.

We at Perkins have been promised our copy of Mr. Morrison's System very shortly. We understand, furthermore, that Mr. Morrison is already working on further modification that will make it possible to provide a Braille Printout in sheet form this month. We are also promised an experimental model of the MIT System as soon as it is ready for use. This will give us at Perkins an opportunity to test, side by side, in our computer time-sharing installation, the relative merits of the two systems.

WHERE DO WE GO FROM HERE?

Our early pioneer experimentation with this computer time-sharing program seems to have been a fruitful experience. We know that it can motivate students in our mathematics and science classes, and that it can render more effective some of the learning processes there. We know also that our blind students can acquire some skill in operating the computer through a teletype terminal and that they can successfully perform exercises in simple

computer programming. There are a number of problems facing us, however, that we are not certain we have yet solved adequately.

The first, of course, is the question of the effective Braille Printout. Although we are promised with considerable optimism two systems of Braille Printout for our equipment, neither of these have yet been tested with our students. The MIT System appears to be still a bit in the future. Mr. Morrison's System, although just about ready for use, has the slight disadvantage of being a narrow tape and will require considerable testing. We are encouraged to believe that both of these printouts will be very useful to our blind students. We will certainly be seeking every way we can find to improve this printout and will welcome suggestions from others in the field.

Another question in our minds has to do with the course outlines and manuals to guide both our teachers and our students as they learn to program and to operate our computer. At present, we are following course instructional outlines furnished by General Electric Company. One of these course outlines that seems to be most effective with our students is called "Introduction to the BASIC Language." As yet, however, our teachers have not had enough experience to know conclusively whether or not they are providing our students with all of the step-by-step instructional material necessary to make them competent computer programmers. We are interested in hearing from other instructors in this field who may have suggestions as to how we may improve our course offerings in this important field since we would like to give our students as complete a training course as possible. A further problem is the securing of adequate manuals and course materials in Braille. As yet, we have not been able to examine either manuals or course materials that may already exist in Braille. On the other hand, we do not wish to undertake the great expense of putting materials of this kind into Braille unless we are certain we are considering the most effective materials for our course. Here again, we welcome suggestions from more experienced workers in this field.

A further question in our computer future, we believe, has to do with possible evaluation materials that would help us to measure reasonably accurately the potential of our students for vocational success in the computer field. If, through a battery of tests, either in the very beginning or at least after a short introductory training course in the computer, we can predict which of our students are likely to succeed as computer programmers and which are

likely to fail, we can counsel our students accordingly and prevent a good deal of wasted effort on the part of a number of them. We know, of course, of a few of the important requirements for success in computer programming, but we are led to believe that there are other factors not as easily identified. This area of early evaluation is of considerable interest to us and again we welcome any suggestions.

EVALUATION OF INTELLIGENCE, ACADEMIC APTITUDE AND ACHIEVEMENT OF THE VISUALLY IMPAIRED

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When defining the terms, intelligence, academic aptitude, and academic achievement, we will not explore the various theoretical points of view in depth. The terms are psychological constructs which are being investigated and debated. The concepts are closely linked; for that reason, distinctions are sometimes semantic and confusing. For purposes of this discussion, the more traditional distinctions will be made, never questioning nor denying the validity of other paradigms.

Intelligence is a general ability or potential for learning, comprising an array of specific abilities. Academic aptitude describes several of the components of this general ability which are specifically related to the potential for school learning. Achievement represents accomplishment, after training, without intending to estimate potential. There is obvious overlap of these concepts.

In addition to thinking of intelligence as a general ability representing a variety of specific aptitudes, it also has several other characteristics which will be assumed: (a) it is innate, (b) it has variations in both quantity and quality from individual to individual, (c) as a potential it is constant in each individual, (d) the utilization or expression of the potential is subject to a host of influences, carnal and environmental. A few of the components or specific aptitudes commonly assumed to be subsumed within this general ability are (a) memory, (b) the ability to see relationships, (c) the ability to make generalizations from specific information, (d) the ability to organize ideas in symbolic form.

INTELLIGENCE TESTS

The difficulty in defining intelligence as distinct from aptitude and achievement, is compounded by limitations of measuring instruments. In general, the measurement of intelligence is an indirect measure. It is a sampling of the product of abilities at a given time, place, and circumstance, on which assumptions about inherent abilities are based. An effort is made to choose intelligence test items which are common to all members of our culture in a variety of subject and ability areas which are not influenced by previous formal learning. While efforts in this direction have brought improvement in psychological measurements, the effects of experience and innate capacity have not been strictly separated.

Intelligence tests are thus assessments of present general abilities on which predictions of future learning may be made. Aptitude tests assess specific abilities on which predictions in specific areas may be made. An achievement test is an assessment of past learning, usually after formal instruction. Any measure of ability is to some extent an aptitude test, and to some extent an achievement test. Despite all efforts, the intelligence test predicts future academic performance better than its predictions in any other area, chiefly because of the highly verbal nature of many intelligence tests.

The limitations of intelligence tests, in general, present themselves as obstacles in the measurement of intelligence of the visually handicapped. Experiences assumed to be common to the entire population are not common to, or are different in quality among, the visually handicapped. Many of the so-called common experiences depend specifically on vision. Others are indirectly dependent upon vision in that a certain freedom of independent mobility is assumed in order to have opportunity at the general and common experiences. This says nothing about the possibility of experiential limitations based upon overprotection or the influences of other emotional reactions or concomitant disabilities which may be associated with visual loss though these often are contributing factors.

The modes of assessment of intelligence are generally limited to the visual or aural-oral media, or through assessment of manipulative skills. Two of these evaluation modes are either blocked completely or hampered to some indefinite extent by the visual loss. The aural-oral mode is chiefly limited to verbal communi-

cation, largely obviating adequate assessment of many aspects of intelligence and accentuating the aptitudes most closely related to academic potential. There may be a difference in the quality of an experience received solely or chiefly through sound in the partial absence of other kinds of related stimulations. Similar limitations occur in achievement testing.

There is the need to exhaust all efforts to assess every potential possible among the visually handicapped, so that we might improve instructional techniques for the purpose of maximizing achievement in each, with the hope that opportunities for attainment and self-expression may be broadened. There are differences in potential which need to be taken into account, and perhaps undiscovered aptitudes which might be trained to the benefit of each individual.

Most psychological tests for the visually handicapped are either tests used with the normally seeing population, or adaptations of them for use with the blind, though there has been notable work in designing new tools for specific use with the visually limited. Adaptations of tests for the general population typically involve alteration or substitution for test items which require vision, with restandardization of the test on a visually handicapped population. Without special care, such alterations change the test so that the interpretation of the results obtained on the adaptation cannot be compared with the results on the original scale. On the other hand, the use of tests for the general population without adaptations assumes equivalent experience and does not take into account limitations imposed by the visual loss. Thus, these limitations are placed on the assessment of innate potential.

Other technical difficulties related to test construction, in general, further complicate psychological assessment. Intelligence tests yield quantitative results in terms of the intelligence quotient, or I.Q. While the I.Q. of 100 is the most common or the average I.Q. among various tests, the distribution of scores above and below are not exactly the same and may be based on different mathematical and theoretical formulations. Direct comparison from test to test is a bit like comparing yards and meters, without calculating or estimating the differences between the scales.

The Binet scales, the more commonly adapted individual intelligence scales, are age scales. Items are arranged in ascending order of difficulty and so arranged that fifty per cent of the

population at each age level is expected to pass all of the items indicated for the age. Various kinds of items appear at each age level on the test. Hence, the concept of Mental Age, from which the proportional I.Q. (Mental Age, divided by chronological age, multiplied by one hundred), is obtained.

The Wechsler scales, the Verbal Scales of which are frequently used in intelligence testing of the visually handicapped, need no adaptation. These scales are divided into subtests representing types of tasks, each arranged in order of ascending difficulty, (Information, Comprehension, Arithmetic, Similarities, Vocabulary and Digit Span). There is no comparable Mental Age; the I.Q. is statistically based upon the so-called normal curve in what is known as a deviational I.Q. (This is a measure of a kind of average deviation, plus or minus, from the most typical score, 100).

Both the age scales and the subtest scales of different abilities yield useful information, but their dissimilarity leads to problems of comparibility. The 1960 revision of the Stanford-Binet adopted the deviation I.Q., but retained the age scale. The technical differences lead to differences in procedure in test administration which introduces other discrepencies between the two widely used intelligence tests.

Only the Verbal Scale of the Wechsler Scales is useful with the totally blind. The validity of the use of any of the Performance Scale subtests with the partially seeing is open to question. A relatively high performance on Block Design might help confirm findings on Verbal Scale and other tests, or tend to rule out the probability of organic brain damage; but, a relatively poor showing on that subtest is not very useful since the extent low vision contributed to the low score cannot be determined precisely.

Relying on a Verbal Scale I.Q., only the segment of abilities most useful in academic achievement predictions is available to us. The scales do offer some comparability of functional intelligence with that of the normally seeing, though experiments suggest that these scales do not measure innate abilities of the visually handicapped as adequately as they might those of the normally seeing. The Wechsler scales are familiar tools and available to psychologists who may need to evaluate an occasional visually handicapped individual; whereas specially adapted tests would not likely be so.

The Comprehension, and perhaps the Similarities and Vocabulary subtests of the Wechsler scales might be expected to be a little lower than would be expected of the normally seeing population: the Digit Span subtest is likely to be higher among the blind than among the general population. Perhaps each of these tends to cancel out the effects of the other. When the results are greatly affected by prorating Digit Span, it may be useful to report the I.Q. both with and without the subtest.

The adaptations of the Binet scales offer some performance items, particularly at the younger ages. As is the case with the general population, the Binet scales are particularly useful in evaluating the very young or the retarded; while the Wechsler scales may be considered to have particular advantage when used with older children and adults.

Solving the many problems has been the outstanding work of several people, some of whom are at this conference. Among those are Mrs. Mary K. Bauman and Mr. Carl Davis. The recent standardization of the Perkins Binet Test of Intelligence for the Blind, by Mr. Davis and his assistants, presents a new and well designed instrument which will be worthy of much discussion when it has had a history of general use.

In 1914, the Irwin Binet, and in 1942, the Interim Hayes-Binet scales were standardized on populations of blind children. Remarkable instruments at the time, the Perkins-Binet Test of Intelligence should reduce many shortcomings of previous scales.

Mr. Davis' Binet adaptation is based upon items in the latest revision of the Stanford-Binet Intelligence Scale which in 1960 eliminated the least useful items in the 1937 scales. Two adaptations were presented, one for the totally blind, and another for those with useful vision. The standardization population is more representative nationally, across age groups, and includes children who do not attend residential schools. The scale for those with useful vision extends from age three through age eighteen; and for those who are totally blind from age four. Performance items using tangible or enlarged materials are included. A test so constructed should be expected to give the most reliable and valid estimate of the largest variety of inate abilities yet possible with the visually impaired.

By shifting items, typically to higher age ranges for many of the

performance items and downward for some of the verbal items, (a more extensive shift was necessary for the scale for the totally blind), the effects of vision loss upon the test results should be more nearly eliminated. This should result in a more stable I.Q. on retest, more reliably rank visually handicapped children, and enhance the predictive powers of the instrument.

The Perkins Binet lacks the half-year scales for preschool children provided on the Stanford-Binet. Thus, there are fewer items the young or retarded child will have a chance to attempt. This, of course, is likely to reduce the reliability of the scale at that age and ability range Standardized on the visually handicapped, it lacks some of the elements of comparibility with the general population. It is an instrument less likely to be available to many psychologists who see only a few visually handicapped children in the course of their career. It is, of course, more cumbersome to administer than is the Verbal Scale of the Wechsler tests. The Perkins-Binet Test of Intelligence for the Blind should become a major instrument, particularly in diagnostic centers, agencies, and schools for the visually handicapped. It should be correlated with the Wechsler scales to help gain a better understanding of the two instruments. Both instruments should continue to be used with confidence, retesting frequently, noting some of the problems mentioned above and elsewhere.

Little has been said about performance tests for the visually handicapped. Relatively speaking, a small number of psychologists use a limited variety of performance tests with blind preschool and school-age groups. The Non-language Learning test, devised by Mary K. Bauman, roughly for ages ten and older measures the placement of forms into a board on three trials and gives a measure that is useful in predicting learning and job performance with concrete tasks. It may be said to be culture free. Somewhat similar tasks are included in the Perkins-Binet. Certainly more tests of this kind for children are needed.

The Haptic Intelligence Scale for the Adult Blind, published in 1964 by Schurrager and Schurrager, is useful at age sixteen and older. It was designed to be the equivalent of the WAIS Performance Scale. According to Sterfield and Avery, the HIS is more useful in predicting grades for the totally blind than the partially seeing. In combination with the WAIS Verbal Scale, the HIS contributes nothing to grade predictions. Subtests include DIGIT SYMBOL (matching design to numbered design in key), OBJECT ASSEM-

BLY (block, doll, hand, ball), BLOCK DESIGN, OBJECT COMPLETION (missing part identified), PATTERN BOARD (reproduce peg patterns), and BEAD ARITHMETIC.

SOCIAL MATURITY

The Maxfield-Buchholz Scale for Blind Pre-School Children is an adaptation of the Vineland Social Maturity Scale. The items of skill and self-help are delayed for the blind, relative to the norms for the normally seeing. The scale is useful below the age of six when parents assist in reporting skill achievement. Though not an intelligence scale, it is suggestive of intellectual functioning.

SCHOLASTIC APTITUDE TESTS

The School and College Ability Test (SCAT) has been adapted, for large print and braille, in a way that makes results directly comparable to results obtained by the normally seeing. The work was done by Carl Davis in cooperation with the publisher, Educational Testing Service. The test is useful from grade four through college sophomore levels. A verbal, quantitative and total score is designed to measure developed skills, and predict school achievement. Scores are reported as standard scores, and are thus comparable from grade to grade. Scores may also be converted into percentile bands for the appropriate grade. Technically, this is a well devised and standardized test which was adapted with particular ingenuity and care. More study and experimentation with it should be conducted and reported.

The Scholastic Aptitude Test, for high school juniors and seniors, is available in braille and large print from the publisher, Educational Testing Service. Standard scores for the Verbal and Mathematical sections are available in each media. More follow-up study showing the predictive value of the obtained scores might well be conducted. From general observations, it seems a satisfactory instrument in predicting college success among the visually handicapped. The SCAT should be a predictor of SAT results.

The American College Testing Program (ACT) is available in large print and braille from Science Research Associates. The battery consists of four tests of general skills in English, Mathematics, social studies, and science.

The National Merit Scholarship Qualifying Test is also available in braille from Science Research Associates. It yields standard scores in five academic skills. It is a standard for scholarship awards.

The Graduate Record Examination has been made available in braille from Educational Testing Service. It may be required for graduate school entry.

ACHIEVEMENT TESTS

Numerous achievement tests are available in braille and large print. A few are worthy of particular note because of their extensive use and study, or because of unique features.

Stanford Achievement Tests, available at the American Printing House for the Blind, have undergone revisions, adaptations, and study, beginning with the work of Samuel P. Hayes, 1941-1943. More recent experimentation has been carried out by Davis and Nolan. The tests are useful in grades two through ten for measuring learned academic skills. Several problems in evaluating the visually handicapped are incompletely resolved.

Blind students more frequently score relatively low on measurements of mathematical computation. Inspection of the problem suggests that the mechanics of setting up problems in braille hamper both instruction and measurement in this area. Intelligence tests related to arithmetic skills suggest that blind students have the potential to learn comparably, were it not for such problems in math.

Reading speed for braille and large print is typically slower than for regular print - how much slower, for which pupils, with what degree of visual limitation, is not well established. Since achievement tests are essentially power tests, extended time or oral administration of some subtests are common practice. The oral method is credited with inflation of test results. Corrective subtraction of a number of points is sometimes made a part of the scoring system. This leads to the question of how large this correction factor should be, and whether the same corrective deduction should be appropriate for all individuals. Allowing extra time lengthens test administration and adds to the burden of test administration.

Despite shortcomings, test results are useful in evaluating school learning, nevertheless.

Another interesting achievement test is the Sequential Tests of Educational Progress (STEP). Like SCAT, scores are reported in percentile bands, presenting a test profile. There are seven subtests appropriate for grades four through fourteen. Among these is a test of listening comprehension which is read by teachers to normally seeing as well as to blind students. As with the SCAT, Mr. Davis and Educational Testing Service together did an outstanding job of adapting this test for the visually handicapped. While some questions about methods of administration will arise in subtests other than the Listening test, comparable standardization and score reporting make it both a useful measure of achievement and a helpful measure for studying the nature of the visually handicapped population and their learning traits.

PROBLEMS AND SOLUTIONS

Test development for the visually handicapped is seriously hampered by the small populations on which tests are sometimes standardized or studied. Another factor is the common lack of systematic evaluation programs; this is probably more true in public school programs for the visually handicapped than for residential school programs. Perhaps there should be a recommended systematic program of testing that might be followed nationally in all kinds of programs. An authority or even a service might be established to score or receive scores from test administrations nationally. Other relevant information should be collected, such as eye pathology and acuity, secondary disabilities, and the like. Useful information relative to learning and teaching could be generated. There is no real substitute for knowledge based on good data at the time of decision m[illegible].

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EMOTIONAL DISTURBANCE & SENSORY DEPRIVATION - A POSSIBLE RELATIONSHIP

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I would like to begin my talk this afternoon by reading a poem by a totally blind adolescent boy at the Indiana State School for the Blind:

> The winds rise and black snow falls,
> The waves of black roll on and in,
> The water's cold and the air much colder,
> Here on the Gulf of Darkness we stand.
> Where can we go?
> Nowhere.
> What can we do?
> Nothing.
> It is December.
> There is no sun.
> It is 11:00 o'clock,
> At midnight it is done.
> The land is vast and black behind,
> The gulf is vast and black ahead,
> The waves roll on and in.
> All hope slips and slides --
> Into the Gulf of Darkness.

This sense of despair, hopelessness, and fear of venturing into the world represents feelings frequently expressed by visually handicapped youngsters. This adolescent boy aptly describes his sense of frailty in the relationship between himself and his vast, unknown, unexplored environment.

During the past six years while I have served as consultant for

the Indiana State School for the Blind, I have been impressed by the number of emotionally disturbed children. Some children describe themselves as chronically sad, lonely, isolated, rejected, and unloved by anyone. They depict themselves as inadequate or of little value. They describe crying spells and wish that they had never been born since the future seems essentially hopeless. Yet, although these children may express such feelings about themselves and their lack of interpersonal relationships, usually they do not have suicidal thoughts or suicidal attempts. Other children seem even more inappropriately related or, indeed, unrelated to the world around them. These children are socially withdrawn and isolated. Even at the school they need to be frequently prodded and stimulated in order to be responsive to their social environment. Their thoughts are predominantly preoccupied with fantasies of aggression which are usually directed towards themselves by real or imagined people. They perceive the world as so dangerous that it is only with excessive anxiety and the defensive use of fantasy that they are able to interact with people around them and learn in the classroom.

The necessity for constant interaction between the individual and his environment is no more graphically demonstrated than in the visually limited child. Every child, whether blind or sighted, needs a continuing feedback from his environment to help him evaluate his experiences from which he can, in turn, develop ideas of a reality where he can predict and anticipate events.

During the past 15 years, a number of investigators have been interested in the development of the blind child: his use of hearing and kinesthetic perception as alternative sensory modalities for learning; his development of gross motor behavior and hand movements; his evolution of a self-concept and an object world and his understanding of human interpersonal relationships. The basic question as to whether a child who is deprived of vision from birth can ever achieve mature personality structure is a theoretical one. The psychoanalytic literature has stated that, lacking the continuity with the environment afforded by vision, the blind child consequently directs his attention to his own body experiences. He may be abnormally content to be left alone and indulge in repetitive self-stimulating movements. Yet the blind youngster's development can be modified by suitable mothering and early auditory and kinesthetic stimulation. Unfortunately, he often receives less stimulation because of his mother's reaction to his deformity and the difficulty she experiences

in making contact with him because of her depression. Furthermore, a premature infant who is incubated, is deprived of mother and receives less auditory and kinesthetic stimulation.

This paper reports a preliminary study of the relationship between the presence of emotional disturbance in visually handicapped children and their experiences of primary and secondary sensory deprivation. I differentiate between types of sensory deprivation in the following way.

Primary sensory deprivation is defined as total blindness, therefore, there is no sensory input of vision. There are two types of secondary sensory deprivation experiences. The first type of secondary sensory deprivation experience results from the decreased auditory and kinesthetic stimulation during the first few months of life which occurs because the child is premature and incubated. The infant's mother does not have an opportunity to touch, hold or feed him. The second type of secondary sensory deprivation experience is a social deprivation experience. This sensory deprivation experience occurs with the disruption of the family unit through separation, divorce, or death. The child then has many and varied social environments to which he must adjust and for which he may be less capable of adjusting because he is blind.

In primary sensory deprivation, the source of deprivation is within the infant himself. He lacks the sensory end organ, his eyes, which would provide sensory input. In secondary sensory deprivation, the source of deprivation is external in the environment. The first type of secondary deprivation is a decreased amount of auditory and kinesthetic stimulation as a result of incubation. The second type of secondary sensory deprivation is a variable, changing overload of social stimulation which occurs with the disruption of the family unit.

The nature of the impact of the sensory deprivation experiences upon the child's social behavior - especially in perception and communication - has been recognized for at least 30 years. Orton (1937) theorized that several handicaps in the same child potentiate each other, which multiplies the secondary social behavior problems. Shirley (1939) in discussing prematurity and its effect upon child development, commented "that the premature ejection of an individual into a world he has not grown to fit may have lasting social and emotional consequences."

In 1958, Keeler reported on five totally blind pre-school retrolental fibroplasia children. He described the children as being autistic: socially self-isolated, lacking appropriate use of language for communication, relating to objects primarily by taste and smell, and manifesting repetitious non-functional blindisms or body movements. He postulated that their deviant personality development was due to a combination of total or severe blindness in the first few weeks of life and emotional neglect in later infancy. He felt that the two factors together acted as an inhibitory force to the potential personality development of the infant.

POPULATION CHARACTERISTICS

The author studied the children at the Indiana State School for the Blind. The population has remained essentially stable with approximately 200 children enrolled annually during the past six years. These children comprise approximately one half of all legally blind children in the state. Most of the totally blind children are enrolled at the State School. The children are generally from a lower middle class background with 70% of the children from blue collar or farm families. Thirty percent of the mothers work.

There is a wide range of intellectual capability since the school enrolls children who may be initially untestable as well as children with intelligence quotients in the 150's. The mean IQ at the school is 103.

I. Epidemological Description of the Population

# of Children	Percent	Characteristics of Sample
185	100	Total Population
82	44	Children with Significant Problems in Emotional Growth and Development
60	32	Children with No Vision. (No light perception)
34	57	Totally Blind Children with Significant Problems in Emotional Growth and Development

# of Children	Percent	Characteristics of Sample
13	38	Totally Blind Children with Symptoms of Depression
9	26	Totally Blind Children with Symptoms of Psychosis
12	36	Totally Blind Children with Other Symptoms
48	38	Visually Limited Children with Significant Problems in Emotional Growth and Development
14	29	Visually Limited Children with Symptoms of Depression
7	15	Visually Limited Children with Symptoms of Psychosis
27	56	Visually Limited Children with Other Symptoms

The author was able to categorize every child in the current school population since each child receives a psychiatric evaluation as part of the admission procedure. In addition, any child manifesting school learning problems also receives a psychological evaluation.

The symptoms of depression and psychosis were described at the beginning of the paper. The Other Symptoms category included children with active aggressive behavior characterized by verbal and physical attacks on others and destruction of objects; inappropriate homosexual and heterosexual behavior; passive dependent behavior with infantile dependency and little intellectual or physical motivation; and separation anxiety with constant thoughts about home and family accompanied by somatic complaints which were usually gastro-intestinal symptoms.

II. Primary Symptoms of Children in Each of Four Classifications of Sensory Deprivation Experience

Vision

Type of Deprivation Experience

Numbers of Children:	Depression	Psychosis	Other Symptoms	No Symptoms	
Vision	8	3	11	59	
Vision and Prematurity	3	0	1	7	
Vision Prematurity & Social Disruption	0	1	1	1	
Vision and Social Disruption	3	3	14	10	
	14	7	27	77	
Boys	9	4	13	45	Total 71
Girls	5	3	14	32	Total 54

Table II (continued)

No Vision

Type of Deprivation Experience	Primary Symptom: Depression	Psychosis	Other Symptom	No Symptoms	
Numbers of Children:					
No Vision after Birth	1	0	1	4	
No Vision at Birth	2	0	3	10	
No Vision and Premature	6	2	4	8	
No Vision Premature and Social Disruption	4	4	2	2	
No Vision and Social Disruption	0	3	2	2	
	13	9	12	26	
Boys	7	6	5	11	Total 29
Girls	6	3	7	15	Total 31

Each child is represented only once in Table II.

The clinical, experimental, and theoretical reports in the literature led the author to believe that a sensory deprivation experience would adversely affect the emotional development of visually limited children. Thus, each child was classified according to his primary symptoms and sensory deprivation experience or experiences. The effects of primary and secondary sensory deprivation were then analyzed within the context of the following hypotheses.

HYPOTHESES

I. Primary Sensory Deprivation

1. A child totally blind from birth would be more likely to have symptoms of emotional disturbance than a visually limited but not totally blind child.
2. Severe signs of emotional disturbance, depression and psychosis, would occur more frequently in the totally blind child than in the visually limited child.

II. Secondary Sensory Deprivation

3. A premature and incubated child would be more likely to have symptoms of emotional disturbance than a full term child.
4. A visually limited child, who is both premature and incubated, would be more likely to have symptoms of emotional disturbance than a full term, visually limited child.
5. The visually limited child, who experiences social disruption, would be more likely to have symptoms of emotional disturbance than a visually limited child from an intact family.

III. Combined Primary and Secondary Sensory Deprivation

6. A totally blind, premature and incubated child would be more likely to have symptoms of emotional disturbance than a totally blind, full term, child.
7. A premature and incubated totally blind child would be more likely to have symptoms of emotional disturbance than a visually limited, premature and incubated child.
8. Severe signs of emotional disturbance, depression and psychosis, would occur more frequently in the totally blind, premature child than in the totally blind, full

term child.

9. A totally blind child who experienced social disruption would be more likely to have symptoms of emotional disturbance than a visually limited child who experienced social disruption.

In essence, the hypotheses state that the type (primary or secondary) and number of sensory deprivation experiences which a child encounters, will be reflected in the presence and degree of emotional disturbance.

RESULTS

The hypotheses regarding the primary symptoms of the children and their relevance to sensory deprivation experiences were analyzed using the Chi square method. The only significant statistical analyses related to prematurity with incubation; the combined effect of prematurity with incubation and total blindness; and the impact of social disruption upon the visually limited child. Therefore, the following hypotheses were found to be valid.

A premature and incubated child would be more likely to have symptoms of emotional disturbance than a full term child. The Chi square was significant ($P = 0.01$).

A totally blind, premature and incubated child would be more likely to have symptoms of emotional disturbance than a totally blind, full term child. The Chi square was significant ($P = 0.05$).

The visually limited child, who experiences social disruption, would be more likely to have symptoms of emotional disturbance than a visually limited child from an intact family. The Chi square was significant. ($P = 0.01$).

Presence or absence of vision, as a single sensory deprivation experience, was not a significant factor predisposing these children to deviant emotional development. Also, the experience of prematurity with incubation for a visually limited child was not a significant factor leading to later problems in personality structure. Finally, the totally blind, incubated child had no greater potential for symptoms of emotional disturbance than the incubated, visually limited child.

DISCUSSION

This study supports the hypotheses and the clinical evidence in the literature suggesting the high probability of emotional disturbance in all visually limited children. The high incidence (44%) of the children with significant symptoms of emotional disturbance, has been reported by other state schools for the blind. Furthermore, if the incidence of emotional disturbance in visually limited children is compared to the usually accepted 10 to 12% incidence of emotional disturbance in school children, then visually limited children are four times more likely than sighted children to have symptoms. The professional needs of such children far exceed the usual resources of a school for the blind. Schools must have mental health professionals to work in conjunction with teachers, houseparents and other staff. The Indiana State School for the Blind employs a psychologist, psychiatric social workers, a consultant child psychiatrist, and utilizes available psychiatric outpatient clinics.

This study further emphasizes the fact that problems in emotional growth and development begin long before the child enters school. It has identified possible sources important in the etiology of emotional disturbance in these children. Prematurity which necessitated incubation was the only single sensory deprivation experience which strongly predisposed all the children towards deviant emotional development. In fact, serious psychopathology, psychosis and depression, was significantly more frequent than other symptoms in the premature child ($P \simeq 0.05$). As Wiener has pointed out in his careful review of the literature, prematurity and incubation do significantly increase the possibility of disturbances in personality structure. Socially and economically, the children in this study resemble studies of premature infants where the incidence of low birth weight has been reported to be greater in lower-class families.

The studies of mothers' attitudes toward premature children (Wiener, Smith et al), did not reveal a significant difference in the mothers' feelings and attitudes toward their premature infants when compared to mothers' feelings and attitudes toward full term infants. The attitudes of the mothers of the children in the present study were unknown. There may be a difference in maternal attitude if the mother is confronted with a visually limited child irregardless of his prematurity or amount of vision. A significant number of mothers may have had a negative attitude

toward their children. But, if this is true, then all of these children would be equally likely to be affected by such an attitude.

Total blindness from birth had no greater effect than limited vision upon the child's development. These results were unexpected. The seemingly inherent stress and anxiety of total blindness in perception, organization and understanding the environment were thought to be overwhelming for a child who had never seen. It may be that such children who are with their mothers from birth are able to compensate through the auditory and kinesthetic modalities and establish a primary relationship.

The visually limited child was more likely to be significantly affected by social disruption. It may be supposed that he has developed the strongest emotional ties with his parents. It is the author's clinical impression that the visually limited child often experiences excessive and prolonged physical contact with his parents. These children relate fantasies of being the destroyer or savior of the parents' marriage.

The visually limited child showed compensatory capabilities in making contact with his environment. Symptoms of emotional disturbance were no more frequent in the incubated, visually limited child than in a full term, visually limited child. It can be theorized that once the incubated infant is with the mother, vision aids in the development of the primary mother-child relationship. Furthermore, during incubation, the limited vision may aid in the initial environmental orientation.

A child who is both incubated and totally blind is a high risk candidate for becoming emotionally disturbed. Although scrupulous attention is generally given to the amount of oxygen in the incubator, children particularly sensitive to oxygen levels develop retrolental fibroplasia and continue to appear at blind schools. A child who is without vision and the stimulation of perception depends upon sounds and tactile experiences for learning and relating to his environment. The infant in the incubator is rarely in the care of only one person. He is exposed to a variety of sounds and tactile experiences. The only consistent sensory experiences are those of the incubator itself and the gavage tube. Prolonged incubation postpones the time for the development of the mother-infant bond. The totally blind, premature infant who is deprived of consistent auditory and kines-

thetic experiences and delayed in establishing a close, dependent relationship upon his mother, is prone to deviant development.

The question of a critical time period of separation from the mother after birth was not explored in this study. It would seem important to know whether there is a relationship between the number of weeks an infant is incubated and the probability of development of emotional symptoms. Such a situation presents an excellent opportunity for primary preventive psychiatric intervention. These children would seem to require contact with the mother as early as possible through talking, touching, and feeding them in the incubator. The education of all children begins in infancy with the mother-teacher. The establishment of a mother-teacher relationship with a premature, totally blind child is a particularly critical factor for future personality development. Therefore, examination of the visual acuity of all premature infants in order to clarify the amount of vision and to lessen the probability of future problems in personality development is indicated by this study. Other studies are in process relating the etiology of blindness, intellectual endowment and scholastic performance, neurological findings, and other handicaps to presence and severity of psychopathology.

Summary

Premature children with sensory deprivation experiences of total blindness, incubation, and social disruption, are high risk candidates for becoming emotionally disturbed. As a single factor, prematurity was found to increase the probability of symptoms of emotional disturbance in all visually limited children. Social deprivation affected only the visually limited children. The combined effects of total blindness (primary sensory deprivation) and prematurity with incubation (secondary sensory deprivation) increased the probability of emotional disturbance more than either of the two conditions alone. Efforts to help the infant establish a relationship with his mother while he is still in the incubator seems imperative.

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RETROSPECTIVE OBSERVATIONS OF THE RETROLENTAL FIBROPLASIA POPULATION AND RELATED AUTISTIC TRENDS IN BEHAVIOR

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Over the years, many children with RLF were observed to display symptoms of early infantile autism, and many were diagnosed as having the disorder itself. The first professional position I held was with such a group of children, and several questions remained with me as I continued to teach visually handicapped children: What relationship, if any, existed between the appearance of the two conditions (RLF and Infantile Autism) concurrently? What etiological factors in the behavioral problem might be traceable to the incubator, hyperoxygenation, or other early factors? To what extent were those RLF children, who were disturbed, truly autistic? How did such a diagnosis influence their development? When an opportunity arose to undertake a research project, I sought to answer these and other questions in a retrospective fashion.

Perhaps the first question to answer concerned the diagnosis of autism itself. Reviewing the literature back to Kanner (1943, 1949, 1954, 1957, 1958), who coined the term, discrepancies in both the symptoms and nature of the disorder are apparent. Kanner views the diagnosis as discrete, dependent upon symptom "count" and severity, whereas others use a less stringent "continuum" approach. Rimland (1964) supports the former view, and recommends a diagnostic instrument which he has devised as a means of separating out true "autistic" children from those with less specific symptom range or intensity. Rimland's checklist was used in the study reported here. Rimland further discusses current views of the etiology of autism, separating them into two general schools, "psychogenic", (parental/environmentally induced), or "biogenic", (arising out of physiological, possibly genetic, differences).

Having visited many families whose children resembled textbook descriptions of autism, it was of interest that parents' handling differed widely. Environmental factors were considerably variant, and it appeared that families responded to the difficult fact of their child (who was developing peculiarly in addition to the blindness), so that life styles were perforce modified. Nonetheless, a variety of variables were necessary to evaluate trends as objectively as possible. The RLF group in New Jersey was retrospectively studied to see which variables differentiated those who demonstrated autistic symptoms from those who did not. In effect, the study viewed RLF subjects as a high risk group for autism. Rimland (1964) mentions the RLF population as such a group.

Two hundred and sixty-three Ss registered with the New Jersey Commission for the Blind met the following criteria for inclusion in the study: Date of birth prior to 1958, residence in New Jersey and diagnosis of RLF with total blindess or sufficient loss of vision to require braille as the reading medium. Data were collected via parent interviews, ratings by professional New Jersey Commission for the Blind workers, and the case history files at that agency.

Four major hypotheses were tested, each suggesting a relationship between the presence of autistic symptoms and variables grouped according to etiological theories, as follows:

I. The literature suggested strong relationships between light birthweight/short gestation time and later clinical signs of neurological impairment (Knoblock, et al., 1956; Weiner, et al., 1965; Cutler, et al., 1965; De Hirsch, Jansky and Langford, 1967, among others). Further, the fact of high oxygen administration offered another variable obviously found to relate to concommitant neurological problems (Glavin, 1966; Meyer, 1967). Therefore, the first hypothesis posits a relationship between frequency of autistic symptoms and the physiological (or neurological) variables of low birthweight, short gestation, and high oxygenation.

II. In reviewing the literature, recent investigation was found to link early deprivation of stimuli and/or maternal contact with later symptom development

(Provence & Lipton, 1962; Heider, 1966; Harlow, 1958, among others). Therefore, the second hypothesis posits a relationship between frequency of autistic symptoms and duration of incubation and/or hospitalization.

III. The third grouping under consideration as a correlative variable with symptoms of disturbance concerns other physiological variables related to intervention. In this regard, early medical practice during the period when the etiology of RLF was unknown were reviewed. Two external variables, the administration of ACTH and of blood transfusions were chosen from a multitude of possibilities for their prevalent use. Limited citations (Lanman, 1957; Dunham, 1955) were found in the literature. Hypothesis III, then, posits a relationship between frequency of autistic symptoms and these medical practices.

IV. The literature on autism is widely characterized by discussion of parent-child variables. Kanner, from his earliest writings on the subject (1943, 1949), described parents of such children as cold, detached, intellectual but emotionally unavailable, of high intelligence, "mechanized" in human relationships, etc. He was particularly struck by the high degree of intellectual accomplishment in these families. Ethnic background also played a role in his observations, with a high proportion of Jewish and Anglo-Saxon families seen. Other authors have concurred with these observations (Wolff & Chess, 1965, McDermott, et al , 1967, among others). Therefore, a fourth set of hypotheses concerned the relationship between frequency of autistic symptoms and parental socio-economic status, intellectual level, emotional reactivity and religious/ethnic background.

Data was collected from parents via Rimland's Checklist for Autism, an especially designed instrument. In addition, workers who have known the family completed ratings, and all case histories and records were subjected to ratings. Neurologist's reports, where available, were also rated.

Statistically significant correlations were found in only two categories, the birthweight-gestation findings, and the

intellectual level aspect of Hypotheses IV. In the former instance, surprising outcome emerged. The significant correlation for birthweight and gestation was in direction opposite from expectation; in other words, those children who had been *less* premature by either the weight or time definitions were found to demonstrate a greater number of symptoms. The second finding, that of parental intellectual level, followed previous observations in that the higher this level in the parents, the greater the number of symptoms.

Additional outcomes of the study warrant mention. None of the RLF subjects, in retrospect, had severity of symptoms to warrant the clear diagnosis of "autism" by Rimland's definition, although several approach his threshold level. Further, a rather general assignment of the 263 subjects into two groups (Table 1) demonstrates an almost equal dichotomous separation between those who "made it" and those who did not. An incidental finding from the parent interviews suggests that many parents were ill-prepared for evaluating progress by attributing may of the serious symptoms to blindness.

How can such a retrospective study assist our work today? For one thing, the study indicates (Rimland's Checklist is completed as of five years of age) that signs of difficulty were evident early in life. We *knew* that the developmental sequence was different for many of these children. Although environmental changes may not alter the physiological implications, earlier intervention and counseling may have made a difference for some members of the group. Too often, Western man draws an unreal separation between mind and body such that we "write off" situations where physiology imposes severe limitations. In this age of growing multi-handicapped populations, we need to find ways of fostering growth, even in cases of extreme impairment.

The social context was found to have some relevance. Certainly, the existence or absence of meaningful language was found to be a critical indicator for the future. Parental interaction, so often characterized by guilt and despair, may be amenable to change through structured use of early language experiences. We need to reexamine our attitudes toward behavior in terms of interactive cause, be it behavior of parents or of impaired children.

Finally, the striking loss of the more severely impaired subjects in the study is the loss of the ability to derive pleasure and to choose to do so. This philosophical level of studying

Table 1

Distribution of Subjects According to Present Placement
(Functional Level)

Functional Level Group	Placement	N	%
A (N=129) 49%	Employed	7	2.7
	Attending College or Graduate School	10	3.9
	Attending Rehabilitation Training Program	4	1.5
	Attending Regular Public, Private or Parochial Day School Program	72	27.4
	Attending Regular Residential School Program for the Blind	36	13.7
B (N=134) 51%	Attending Sheltered Workshop or Special Job Training	7	2.7
	Attending Special Public, Private or Parochial Day Program	21	8.0
	Attending Special Residential School Program for Multiple Handicaps	56	21.2
	At Home	13	4.9
	Placed in State or Private Custodial Institutions	37	14.1
--		(N=263)	100.0%

existence is rarely touched in professional conference. Through the years, we tended to act upon the RLF group in such a way as to facilitate some of the symptoms we now consider negative. How might we have allowed these children and their parents to act upon the environment in a freer, rather than more constructed ways. Might we examine our teaching and service models to foster emotional availability? Do we value passivity and encourage loss of will? Do we view the severe cases in human terms and see humanity in the emotional fabric of severely impaired children?

Quite practically, it is suggested that energies be expended toward prevention first, but in those cases where prevention is not possible, let us attempt to reach the coming populations with recognition of severe physiological states. Let us attempt to design procedures which will bring more "human" behaviors in gradual increments. Let us offer parents opportunities to learn and grow with us, and be self-critical at every point of decision. We may find a greater record of success than that with those who had retrolental fibroplasia.

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THE SEXUAL & SOCIAL ADJUSTMENT OF VISUALLY HANDICAPPED ADOLESCENTS: A LONGITUDINAL APPROACH

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I. Introduction

Several months ago, a teacher of ceramics approached me concerning the behavior of one of her students. She indicated that one of her male adolescents might behave "improperly" if he were to attend a class trip to a local museum. Specifically, the concern was directed toward the student's desire to explore tactually in great detail the male and female nude statues, particularly the genitalia. The question raised was whether or not to allow the student to attend the trip for fear of embarrassing sighted visitors to the museum. Needless to say, this male adolescent was attempting to satisfy his curiosity concerning body structure in general and the genitalia in particular. Knowledge of this boy's background indicated that his sexual education was severely lacking, that his experience in normal body exploration as a youngster was prohibited and his need so great that information at any cost become the predominant force in his life even at the risk of his being socially disapproved by others.

It is difficult to talk of the sexual and social adjustment of visually handicapped adolescents. To talk only of the adjustment of adolescents implies that the period of time being discussed is an end product. As Davis (1) stated, "A drawback of most research on the 'adjustment' of the blind was that each project based its claim on a sampling of behavior at one period of each subject's life span." Rather, the emphasis should be placed on the developmental process as it unfolds over the years. The total

process and all of the contributing forces and factors should be noted and accounted. For example, the attitudes and experiences of the child when he first arrives at school, the school's role as seen historically and philosophically, the degree of visual loss and the age of onset of blindness of the students, staff attitudes and training, all are factors that will determine in part the type of program and its effects on the sexual and social adjustment of the blind youth.

Consequently, this paper will attempt to explore the above factors, consider the developmental process of the body image, discuss the self-concept needs of blind youth and make suggestions for more adequately meeting the sexual-social needs of blind youth.

II. Sexual and Social Needs of the Blind

The sexual and social adjustment of visually-handicapped adolescents, as noted above, should be perceived developmentally and longitudinally. Consequently, this paper will attempt to explore the developmental process of the body image and discuss the self-concept needs of blind youth. The premise is advanced that if the development of the body concept and subsequent self-concept is adequate, the blind adolescent will be sexually and socially well adjusted. However, if the developmental process is adversely affected by inadequate experiences, limited affectual relationships, unsuccessful or limited school programs, the resulting social and sexual behavior of visually handicapped adolescents will be found wanting.

A. Development of the Body-Concept

Numerous authors (Davis 1, Hooft 2, Jervis 3) have published articles concerning the development of the body concept of blind youth. It is not possible to provide a detailed report in the time allowed. However, I would like to talk of various needs that must be met if the body concept is to be adequate and to mention the difficulties that are encountered and must be overcome.

Initially, the infant is completely self-oriented and cannot differentiate himself from his environment. Those people in his life who satisfy his most basic needs are perceived as extensions of himself. Gradually, the process of differentiation, seeing himself as something apart from his environment, occurs. More-

over, he becomes aware that he is a separate physical entity and that he can examine his toes and fingers. Davis (1) states, "By so doing, he begins to develop a mental image of his own body structure."

Obviously, the process just mentioned is more difficult for the blind child. Lacking sight, the child must be encouraged by the mother through talking as well as by action to explore and locate the characteristics of the environment about him to enable the separation of the body from the environment. This process of differentiation and the integration of an adequate body image obviously will proceed more slowly for the blind child.

A second need the blind child possesses subsequent to the differentiation process is to become acquainted with his body structure and to perceive its relationship to the body structures of peers of the same sex. Lacking sight, it is much more difficult for the blind child to learn of his body. Often unintentional obstacles are placed in the way of the blind child in his efforts to receive this information tactually. As Hooft (2) indicates it is not difficult to hide things from blind children and this is done regularly with regard to body exploration. However, in reality, blind children attempting to examine their own bodies and the bodies of their peer mates are merely attempting to compare their physical structures and to learn about themselves through the comparison of their bodies with the bodies of their peers. As these children grow and their bodies change each blind child desires to know whether he is developing in the same manner as other children.

As a consequence of learning at an early age that tactual exploration of their bodies or the bodies of peers is considered by adults to be "wrong," the blind child will engage in such exploration activities in the washroom, the cottage or on the playground. It must be emphasized that these explorations are normal, are a result of a developmental need to learn about body structure, and if thwarted will result in distortion and possible preoccupation with these matters.

B. Development of the Self-Concept

The individual, blind or sighted, does not operate in isolation but is in constant interaction with his environment. The self system acts upon and attempts to control or change the environ-

ment (Jervis 3). In return the environment produces feedback which may or may not bring about changes depending upon the need structure of the individual.

Jervis (3) indicates a basic need, with regard to maintenance of the self system, is the need to feel adequate, to feel competent, and to be effective as a human being. However, for some individuals this need is intensified either as a result of compensation or the need to conceal or deny all inadequacy. Obviously, if an individual with intense feelings of inferiority feels inadequate, he will compensate by having an intense drive for superiority.

It is more difficult for a blind person than for a sighted counterpart to master his environment and thus feel adequate and confident. If the environment is perceived as being a possible threat to the maintenance of the self system, interaction with the environment can be avoided or the individual may attempt to block out negative feedback. Obviously, it is quite easy for a blind person to avoid interacting with his environment and, in some cases, it is quite difficult to obtain accurate information from a sighted environment particularly if sighted people tend to protect a blind person rather than to let him develop a realistic attitude regarding himself and the world around him.

A second need that blind or sighted individuals possess in the maintenance of an adequate self system is to avoid anxiety. This is accomplished by finding evidence in the environment to support the individual's assumptions about himself in one of several ways. It may be possible to obtain only positive evidence by the process entitled selective perception. Moreover, negative feedback from the environment can be avoided. Lastly, inadequacies may be rationalized. All too frequently one may hear of the blind child attempting to explain his inadequacies or failure by placing the blame on his "blindness." As Jervis (3) points out, the more a person is made to feel that he must be adequate all the time the greater will be the tendency to develop avoidance techniques.

A third need of blind adolescents according to Sherif (6) is the growth from a dependent state to an independent status. This movement toward independence may be hampered by society in general or by the family specifically if the blind person is viewed as permanently dependent. At the same time the blind adolescent comes in contact with the world of seeing adolescents who move rapidly toward independence particularly with regard to mobility.

As further evidence of the disparity between efforts on the part of the blind adolescent to move toward independence as compared with efforts by significant adults in his life to at times maintain his dependence Davis (1) feels that many blind youth are confronted with "the projected image concept." This concept is the continual emphasis on the need to present a positive picture to the seeing world. Any effort by the blind adolescent to adhere to his sighted peers' likes and dislikes with regard to clothing or hair style often is chastised. The validity of such chastisement is not being questioned at this point. However, the fact remains that the blind adolescent's efforts to conform to peer pressures coupled with reduced acceptable avenues of social behavior leads to frustration and as a consequence the blind adolescent may become either overly assertive and aggressive or assume a dependent status.

III. Recommendations

Although programs aimed at the development of sexual and social adjustment have been increasing in number across the country for blind youth, it is my opinion that the existing programs are not adequate for all blind children. For those individuals with a severe experiential lack in the early formative years, the distortion of the body image and resulting inadequate self-concept becomes progressively worse regardless of the typical program concerned with sexual and social adjustment. Hooft (2) mentions that it is so easy to keep the child away from all sexual knowledge and experience. For this reason sexual development threatens "to grow crooked." Moreover, it is interesting to note that many parents and educators desire to "let sleeping dogs lie" by not allowing blind children to explore their bodies or to discuss this need for fear that the blind child will become preoccupied with such matters to the detriment of his school work. I suggest that as a result they accomplish that which they fear the most. It is for the above reasons that the following recommendations are made.

A. Improvement of Body Image

It is recommended that the learning about body structure and the function of all body organs take place at an early age, preferably in consultation with the parents and long before the children have sexual feelings themselves. It must be remembered that when the blind child becomes conscious of sexual life, he will receive

experiences, perhaps even seeking them out, and that this is a normal stage of development. As Hooft (2) states, the question is not whether it should be tolerated since in any case it will happen.

It is well recognized that verbal teaching of body function and organs of the body is not sufficient. Indeed, the complaints of many blind youth are directed toward those programs that contain only a verbal approach. Many writers and many schools have attempted to make use of models of either specific organs or the overall body structure. A caution, however, should be noted. Models often create more distortion rather than eliminating confusion. A two dimensional representation of the body is highly inadequate and creates the greatest distortion of body composition and function. Moreover, many models are made of materials such as hard plastic which further create distortions. In addition, many models of body organs are not presented in a manner which enables the blind student to perceive the relationship of the organ to the rest of the body.

Recommended techniques and methods employed in sensory awareness presentations are useful and should be utilized by educators of the blind in their efforts to improve the body image of their students. Manaster and Adams (4) utilized sensory awareness techniques with groups of blind adolescents at the Illinois Visually Handicapped Institute in 1968. Perkins School for the Blind has attempted during the past two years to replicate their findings. It became quite evident that many of these children, although possessing high verbal abilities, were lacking in experiential concepts and physical knowledge of their own bodies. It was further recognized that many of these children fell further and further behind their sighted contemporaries as they grew older.

At both the Illinois Institute and Perkins School for the Blind five consecutive sessions, one session per week, were held. Basic concepts and ideas were first presented and as the sessions progressed they were made more complex and more directly applicable to the daily activities engaged in by the children. Attendance was voluntary and members of the staff who participated in the project were oriented by the use of discussions and actual practice in the activities to be presented.

The rationale for the use of sensory awareness technique was the realization that the typical approach employed by most schools for the blind was to provide mobility courses, aids to daily

living, physical education courses and crafts. These efforts were either in conjunction with cottage life, as a special course of instruction, or summer institute. However, it was recognized that many of these children cannot make use of or did not seem to progress as a result of these experiences. Their experiential deficit was so great at the most elementary level of body awareness that the program of sensory awareness was felt useful and therefore implemented. However, it was not felt that such techniques should be a replacement of the above courses of instruction but could be used as a supplement.

The emphasis in all sessions was to enable the children to learn by doing and as a result of verbally describing their actions. Staff members participated and helped to either mold the children in the various activities or presented themselves as models for the children to examine. After each session, the children "flopped" to enable them to discuss what had transpired. Examples of the sensory awareness techniques employed were the "walk around," the "make believe you are in a box," the "how do we look when we are happy or sad," the "fall back," the "tug of war," the "be something," the "pound," and the "sculpture." The last two sessions were devoted to combining some of the earlier activities and presenting them in connection with normal daily activities. Moreover, the emphasis was directed toward the use of the total body in whatever activity was being engaged. A specific description of each of the above activities may be found in the works of Schutz (5).

The staff at Perkins School for the Blind felt that the sensory awareness techniques were extremely useful and had a high interest value for the children. Although this technique will be employed in the future, it was felt that many of the activities and techniques could be directly utilized within the school curriculum, particularly at the early grade levels. Consequently, a motor program was specifically devised and incorporated within the kindergarten program. This program was designed to relate motor activities to the musical activities and games which children learn in their recreational music classes. Every week two classes were devoted to music and movement activities in the music room and three classes were held in the gymnasium where an emphasis was placed on activities in coordination, laterality, body concept and basic motor skills. The purpose of coordinating the two programs was to relate a feeling for rhythm to motor activities in order to make them as efficient as possible. Basic

areas covered included crawling, walking, stop and start, jumping and hopping, and the touching of various parts of the body; i.e., the nose, ear, hand, foot, waist, etc. In each area, the rhythm of the movement was stressed. Moreover, an emphasis was placed upon relaxation and the release of tension through large muscle movements in order to facilitate particular motor patterns.

B. Improvement of Self-Concept

It has been interesting to notice at Perkins School for the Blind the large increase in social activities provided for the children on weekends. It has been encouraging to notice the desire for sighted groups to return for repeated functions. Moreover, the number of outside of school contacts has increased. It is also significant to point out the increased use of mixed sighted groups that interact with a complementary mixed group of blind children.

It is my opinion that the success of the program is not directly related to the increased number of social activities provided. Rather it is the quality of the activity, the development of the interpersonal relationships between the youngsters that has led to the program's success.

At times there appeared to be a spontaneous fusing of the two groups and yet at other times there appeared to be a "distance" between the groups. It is our feeling that the quality of the communication between children or the lack of it determined success or failure. Moreover, I feel an additional important factor in determing success was the preparation prior and efforts during an activity to allow for free communication between the groups. Both seeing youngsters and those that are visually handicapped need to be able to express their perceptions of each other before joining together in an activity and to be able to express their concerns directly to each other. It is therefore suggested that the techniques employed in "group encounters" be considered and adapted prior to, during, and following the interaction of seeing and visually handicapped youngsters.

Lastly, it is suggested that more attention be paid to the varying degree of vision possessed by visually handicapped youngsters and their resulting self-perception of themselves as it relates to the development and improvement of social programs.

It is felt that by being aware that the sexual and social adjustment of the blind is a continuing developmental process, and by using the above described techniques, approaches, and suggestions, fewer visually handicapped children will possess distorted body concepts and self-perceptions.

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USE OF EYES IN PARTIALLY SIGHTED CHILDREN

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The purpose of this paper is to present useful information concerning the vision of the partially sighted child. I define partially seeing as vision ranging from 2/200 to 20/60.

I classify partially seeing as:

Group I	Light perception to 1/200
Group II	2/200 to 4/200
Group III	5/200 to 20/300
Group IV	20/250 to 20/60

The purpose of this classification is to establish an arbitrary standard for the greatest use of residual vision. Children in Group I should be taught braille whenever possible: those in Group II should be encouraged to read some size of type. These are the borderline patients and it is often difficult to decide what to advise for specific individuals in this classification.

Children in Group III and IV should be taught to use their eyes. Group III children need assistance such as special classes, large type, recordings, tapes and individual instruction as well as optical aids. Children in Group IV can usually compete in school as well as in various occupations successfully with persons who have normal vision. Quite often, members of this group do not require optical aids or possibly need only conventional spectacles.

The incidence of the partially sighted is approximately 2,500,000, of which nearly 150,000 are under 21 years of age.

Causes and Incidence of Impaired Vision

1.	Hereditary defects	70%
2.	Retrolental fibroplasia	13%
3.	Infections	6%
4.	Injuries	4%
5.	Tumors	4%
6.	Miscellaneous	3%

Standard Snellen vision charts commonly employed are suitable for testing vision of 20/100 or better. For testing vision less than 20/100 size letters ranging up to 20/800 are needed or present test charts should be used at closer distances. It is more practical to use standard Snellen charts at closer distances. I routinely hold the test chart at 5 feet from the patient. I test at 5 feet because most partially sighted patients can read down to where there are at least 3 to 5 letters on a line which is a more accurate test than using just one letter. Furthermore, it is simple to transpose the vision tested at 5 feet to the standard testing distance of 20 feet by multiplying both the numerator and denominator of the Snellen fraction by 4. For example: when a patient reads the 20/50 line at a distance of 5 feet, the vision is recorded as 5/50. This is transposed to the standard testing distance of 20 feet by multiplying both the numerator and denominator by 4 making the standard Snellen vision fraction of 20/200. (5/50 x 4/4 = 20/200).

There are only three test charts known to me with test letters ranging between 20/200 to 20/100 and these are infrequently used. *This means that a patient for all practical purposes is legally blind whose vision is less than* 20/100. Vision tested on charts with test letters between 20/200 and 20/100, as well as testing vision at closer distances will take more than 10 percent of legally blind out of the legally blind classification because their vision will be recorded better than 20/200. This is a situation where accurate vision testing and recording is causing confusion which needs interpretation and explanation by responsible administrators.

Near vision testing is more important than the distant test because more learning is done at close range. Not only is the size letter essential to know but the distance at which it is read. The advantage of reading a book at 16 inches over a reading distance of 1 inch is tremendous.

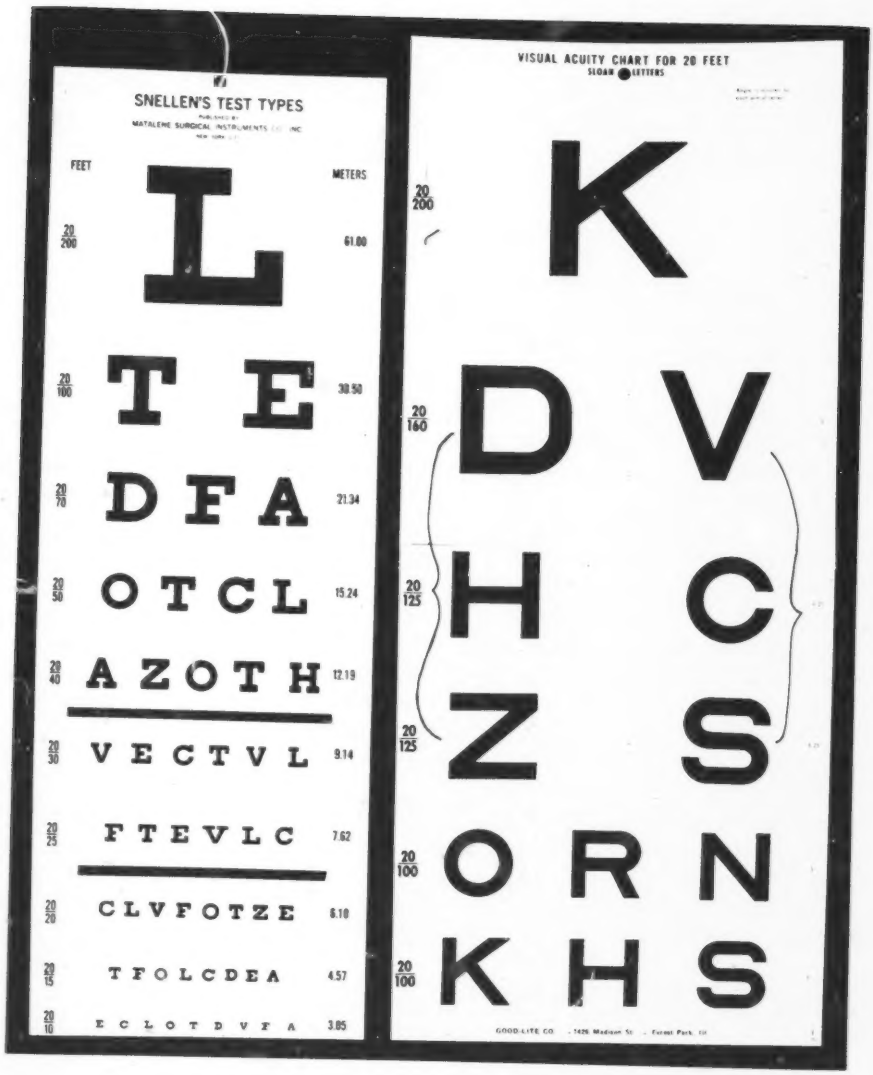

Fig. 1

Snellen charts on left is the type commonly used (no letters between 20/200 and 20/100).

Snellen charts on right shows acuity designations of 20/160 and 20/125 (more than 10 percent of legally blind have vision ranging between 20/200 and 20/100).

The units of measurement for near are the Jaeger numbers, the Snellen designations and the point size. Since these methods are all used without being correlated with each other and samples of size type commonly used, this comparison is given in the following table.

Comparative Near Vision Notations

Jaeger 1	Snellen 0.5	4 point	Small Bible type
Jaeger 2	Snellen 0.6	5 point	Want ads (newspaper)
Jaeger 3	Snellen 0.7	6 point	Telephone directory
Jaeger 4	Snellen 0.8	8 point	Newspaper text
Jaeger 6	Snellen 1 M.	9 point	Magazines
Jaeger 9	Snellen 1.5 M.	12 point	Typewriter type (pica)
Jaeger 13	Snellen 2.0 M.	18 point	Children's books (7-8 years)

I advise the teacher, counsellor or psychologist to test the vision himself on the size type used in school, paying attention not only to the size type but also to the distance at which it is being read. Partially seeing children must hold the paper close to their eyes to see because this is the most common method of producing magnification. The poorer the vision, the closer the book must be held. Holding reading matter close to the eyes does no harm to the eyes. It does have an adverse effect on the posture, therefore reading stands are beneficial.

Children are most favorable for low vision correction because they have never experienced normal vision and adjustment to everything is easier at an early age. *Approximately 70 percent of children with subnormal vision under 10 years of age either need no optical aid or only a distance correction for their refractive error.*

Eye Diseases Favorable for Low Vision Correction:

1. Achromatopsia (complete color blindness)
2. Albinism
3. Aniridia (absence of iris)
4. Cataracts (when surgery is not recommended or accepted)
5. Coloboma of retina, choroid and optic nerve

6. Keratoconus (irregular scarred cornea)

7. Macular aplasia

8. Heredo-degeneration of macula

9. Pathologic (progressive) myopia

10. Surgical aphakia for congenital cataracts

11. Retrolental fibroplasia

Eye Diseases Less Favorable for Low Vision Correction:

1. Choroideremia (absence of choroid with constricted field of vision)

2. Advanced diabetic retinopathy

3. Visual field defects e.g. due to brain tumor

4. Glaucoma (advanced)

5. Optic atrophy associated with severely constricted field of vision

6. Retinitis pigmentosa when central vision is poor

Most of these unfavorable eye diseases are characterized by a severe progressive constriction of the visual field.

One should not despair even with the most unfavorable eye disease because it is amazing what an intelligent, well-adjusted and strongly motivated person can do. I would not believe this had I not examined so many of these cases.

Methods of Correcting Subnormal Vision for Distance:

1. Careful refraction

2. Nonoptical method

3. Contact lenses for keratoconus

4. Telescopic spectacles

I have been able to make a significant improvement in distant vision of approximately 20 percent of patients by a careful refraction because many children are very myopic (near-sighted) or hyperopic (far-sighted) and many have a high astigmatism which is usually associated with the myopia or hyperopia.

The nonoptical method is the most natural, simple, flexible and inexpensive method of producing magnification. This is the method unwittingly used by all people when they move closer to the object of concern.

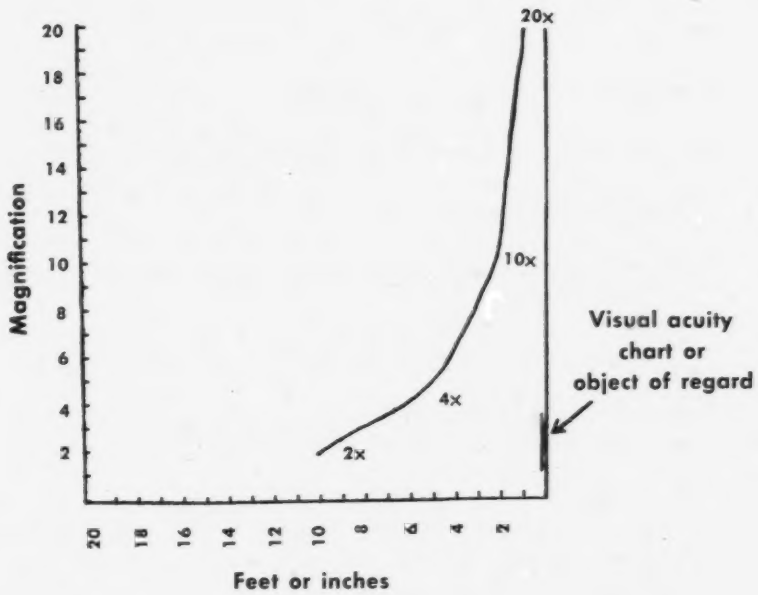

Fig. 2. Nonoptical Magnification

Magnification of 2X is produced by advancing from 20 feet to 10 feet from the object of regard; a magnification of 10X is achieved by advancing from 20 feet to 2 feet from the object of regard. The nonoptical method has great application in the classroom. Sitting in the front row instead of the back row produces a magnification of 4X and moving the chair up to the blackboard produces

a magnification of 10X. Sitting close to television also produces the same flexible magnitude of magnification. There is no known evidence that sitting close to color television has been harmful. Subnormal vision justifies the risk benefit ratio for sitting as close as one foot from the television set.

A contact lens is the only optical aid which rehabilitates a partially sighted person almost completely so that he can see clearly at a distance of 20 feet, 18 inches and 12 inches. A contact lens is indicated for keratoconus (irregular and often scarred cornea) and seldom for any other eye disease.

Telescopic spectacles produce a magnification of about 2X and constrict the visual field to less than 14 degrees; consequently, they make the patient legally blind if he is not already blind.

Legal blindness is defined as vision of 20/200 or less in the better eye with the best correction, or a visual field constricted to 20 degrees or less in the greatest diameter even when the central vision is 20/20.

Telescopic spectacles are dangerous to wear for distance because of the severe constriction of the visual field as well as the fact that objects appear large and close. They also magnify motion when the head is turned. Why wear a correction for both eyes when only 20 percent of children with low vision use both eyes together? The need for magnification for distance is infrequent and intermittant and is best corrected with a monocular telescopic spectacle which can be held before one eye or clipped on to the spectacle frame.

Methods of Correcting Impaired Vision for Near Vision:

1. Careful refraction
2. Nonoptical method
3. Strong plus lenses
4. Contact lenses
5. Telescopic units

Most children with low vision request aids for near. This is fortunate because more improvement can be made for near than for distance.

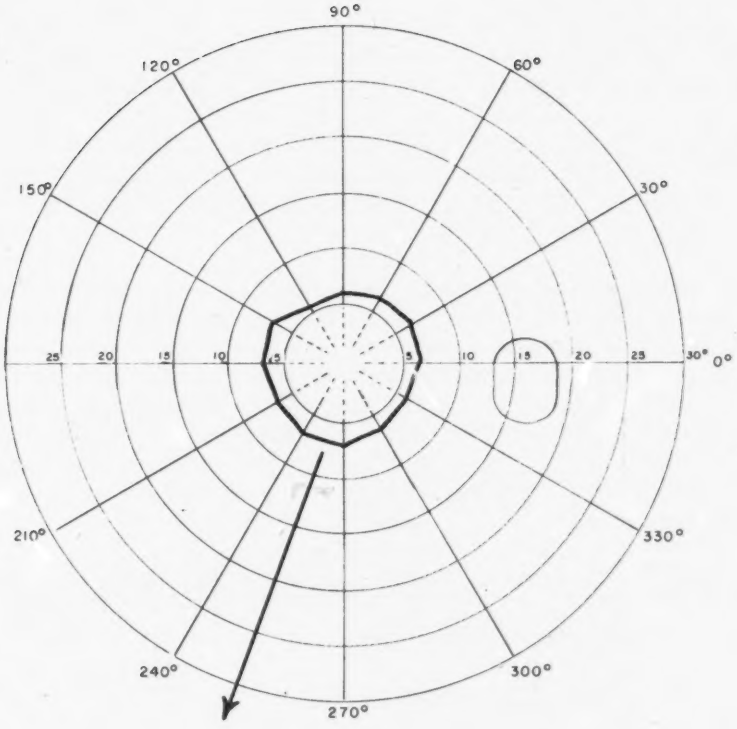

Fig. 3. Visual Field of 2.2X Telescopic Spectacles

Every patient with low vision should have a careful refraction because many have high myopia, hyperopia or astigmatism for which a spectacle correction rehabilitates the patient to a large extent.

The nonoptical method has even greater application for near than for distance. Type brought from 20 inches to 5 inches from the eye produces a magnification of 4X. Type brought from 20 inches to 1 inch from eye produces a magnification of 20X.

Strong plus lenses are indicated when the child cannot hold the book close enough to produce adequate magnification. This occurs early in the far-sighted (hyperopic) patient and later when there is no refractive error when there is a need to read fractions and small type.

In about 90 percent of all cases where contact lenses should be prescribed they are indicated for keratoconus. Occasionally contact lenses are indicated for corneal scars and healed keratitis.

A telescopic unit consists of a reading cap placed over the telescopic spectacle which enables the patient to read. A telescopic unit is indicated in preference to equivalent magnification in a strong plus lens when an increased reading distance is imperative. I have never observed this indication in anybody less than age 21.

The greater the strength of the optical aid the greater is its limitation. They do not improve vision to 20/50 so that the patient can pass a driver's test. It is dangerous to drive a car with telescopic spectacles because the visual field is constricted to less than 14 degrees, the object of regard appears larger and closer, and motion is magnified. The greatest disadvantage is that vision cannot be improved for intermediate distances ranging from 4 to 18 inches. This means that the partially sighted are usually excluded from reading music while playing an instrument, performing the functions of a laboratory chemist, accountant, stenographer, bookkeeper and a machinist.

Large type was introduced 60 years ago in London because it was believed that reading at distances close to the eyes was harmful. Now, ophthalmologists agree that this is not a harmful practice; consequently, the reason large type was promoted is no longer valid.

Large type is usually 18 point type, the size routinely used in first and second grade. The size of standard text is generally 12 point type. The 18 point type is 1.7X larger than 12 point type. The same magnification is gained by reading 12 point type at 4.8 inches as reading 18 point type at 8 inches from the eyes.

TABLE 1

Relation of Vision and Distance to Reading 8 and 12 Point Type

Vision	Distance at which 8 point type (newspaper) text is read (inches)
20/50	14.0
20/100	7.0
20/200	3.5
20/400	1.75

Vision	Distance at which 12 point type (typewriter) is read (inches)
20/80	14.0
20/160	7.0
20/320	3.5
20/640	1.75

A person needs only 20/50 vision to read the newspaper and 20/80 vision to read 12 point type at a reading distance of 14 inches. By reducing the distance by one-half, that is to 7 inches, he can read newspaper text when his vision is 20/100 and typewriter type when his vision is 20/160.

By reducing the reading distance by one-quarter, that is, to 3.5 inches, a person whose vision is 20/200 can read the newspaper, and one whose vision is 20/320 can read typewriter type at 3.5 inches.

The facts given in Table 1 raise the question why large type is recommended for a child whose vision is 20/200 or better. If a patient's vision is 20/320, he would probably prefer to read

standard 12 point type at a reading distance of 3.5 inches rather than large 18 point type at 6 inches.

The same magnification of 1.7X is achieved with standard 12 point type at 2 inches as with 18 point type at 3.5 inches.

Disadvantages of the Use of Large Type:

1. It is rarely available in high school and college texts and not available in books at the graduate level.

2. It is not available for all subject matter and in all editions of same book.

3. The patient's disability is emphasized.

4. Books printed in large type are more expensive than those in standard type.

5. Large size and heaviness of books are objectionable to children.

6. It is difficult to find employment where large type is used.

Indications for Large Type:

1. When distant vision ranges from 2/200 to 10/200 (decisions are often difficult for upper and lower limits.)

2. When the patient cannot read 12 point type (pica typewriter) at 2 inches from the eye.

3. When a greater reading distance is mandatory, for example, for mathematics and accounting.

4. When a patient insists that large type is more comfortable and easier on his eyes (this statement may be valid, but the advantage is offset by the need for a larger book).

COGNITIVE PATTERNS IN SUBJECTS BLINDED BY RETINOBLASTOMA*

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Hunter College, New York City

Observations have been made over the years that survivors of retinoblastoma demonstrate higher intellectual capabilities than the general population or the population of blind individuals. These observations have been supported by some research (Williams, 1968; Thurrell & Josephson, 1966), and further reported informally (Taylor, 1965; Davis, 1965). Retinoblastoma (cancer of the retina with early onset for which enucleation and/or radiation therapy are performed) is of known genetic etiology (Reese, 1954; Ellsworth, 1969), thought to be a specific gene defect (Kitchen, 1970). Evaluation of the cognitive superiority of this Population, and its components, may, it is hoped, shed light upon the genetic contributions to intellectual development.

Prior study of the cognitive pattern in congenitally blind subjects revealed that this group was more global in perception (that is, dependent upon contextual clues and less articulated on tactile disembedding tasks) than the sighted controls (Witkin, et al., 1968). The measures which were employed to tap these variables in these groups and those with retinoblastoma are as follows:

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*The research project herein reported was conducted by the author in collaboration with Herman A. Witken, Philip K. Oltman, and Florence Friedman and supported by a Grant (M-628) from the United States Public Health Service, National Institutes of Health. The complete report will appear in: J. Hellmuth (Ed.), *Cognitive Studies, Volume Two: Deficits in Cognition,* New York: Brunner, Mazel, 1971.

1. The Tactile Embedded Figures Test: This test of analytical ability in perception is the tactile analogue of the visual Embedded Figures Test, prepared in thermoform. There are 15 pairs of figures, each containing a simple and complex pattern, and the subject is asked to find the simple figure in the complex one (see plate 1).

2. The Auditory Embedded Figures Test: An auditory version of the above, prepared on tape with simple and complex note patterns (tunes) played on an organ.

3. Tactile Block Design Test: This test of analytical ability in problem solving is a haptic version of the Wechsler block design subtest, prepared in screen and oaktag. The subject is asked to reproduce patterns within a time limit (see Plate 2).

4. The Tactile Matchsticks Test: A further test of analytical problem solving, the subject is herein asked to remove small rods from a lattice arrangement so as to reduce the number of squares in the pattern. The subject, in the ten such problems, must overcome the organization to discover the solutions (see Plate 3).

5. The Haptic Forms Test: In order to control for differences in form perception which may have influenced results on the above measures, this measure of form without disembedding was administered. The subject is given a plexiglass shape, then it is mixed up with three other shapes and he is asked to find the original from the group (see Plate 4).

6. Wechsler Test, Verbal Scale: Either the WISC or WAIS verbal subtests were administered, depending upon the age of the subject.

7. Clay Models of the Human Form: This adaptation of the Draw-a-Person test was administered by asking the subject to make a model of the human figure (whole person) out of a 3/4 pound ball of clay. The results were rated for articulation of form.

The theoretical framework for analysis findings on this battery is drawn from previous research which indicates self-consistent modes of functioning throughout perceptual and intellectual activities (Witkin, et al., 1954, Witkin, et al., 1962). Three cognitive dimensions have been examined in interrelation. One is the global-articulated dimension, the cognitive style, which has been of particular concern in the previous studies; another is the verbal-comprehension dimension; the third is the attention-concentration factor.

The results of findings with this battery in the congenital group (Witkin, et al., 1968), suggested greater articulation in the sighted on the measures of articulation and problem solving with the exception of the Auditory Embedded Figures Test. This latter measure related more highly to the attention-concentration subtests on the Wechsler. The blind group was superior to the sighted in auditory attention. No significant differences were found in the verbal-comprehension dimension.

In contrast, the retinoblastoma subjects demonstrated more articulated functioning than the sighted group on all subtests, although the findings were not always significant (see Table 1). The verbal-comprehension factor revealed only insignificant differences in the three groups. In the attention-concentration findings, both blind groups were superior to the sighted and similar to each other.

Question arose in analyzing the findings as to whether the Haptic Forms Test contained some disembedding qualities, thereby contaminating the results where form perception was held constant. The scores were therefore adjusted for proficiency on this task, and the results are reported in Table 2.

The results for the samples studied are in keeping with the prevailing impression that totally blind retinoblastoma cases include among them many who function at a high level of cognitive ability. At the same time the results argue against an "overall-superiority" hypothesis, but point instead to superiority in particular cognitive areas. The cognitive pattern that seems typical of at least many totally blind retinoblastoma cases may be characterized as follows: With level of haptic-forms performance controlled, they are clearly superior to the congenitally totally blind on the global-articulated dimension. They are at least the equals of the sighted on this dimension--and on one of the tests used to

Table 1

Means for Retinoblastoma, Congenitally Blind and Sighted Groups

Cognitive Dimension	Test Measure	Retinoblastoma[a]	Congenitally Blind[b]	Sighted[c]
Verbal-comprehension	Verbal-comprehension factor IQ's	118.9	115.9	114.9
Attention-concentration	Auditory embedded figures	82.5	84.5	88.1
	Attention-concentration factor IQ's	122.3	112.5	118.8
Global-articulated Perceptual disembedding	Tactile embedded figures	44.1	136.8	61.7
	Tactile matchsticks	7.2	4.7	5.3
	Tactile block design	18.3	11.7	13.2
Body Concept	Clay models	5.2	3.7	4.9

[a] N for Retinoblastoma group = 28, except for factor IQ's and clay models, where N = 26. $\bar{X}$ age = 16-0.

[b] N for Congenital group = 26, except for verbal-comprehension factor IQ, where N = 21; attention-concentration factor IQ, where N = 18; tactile block design, where N = 25; and clay models, where N = 23. $\bar{X}$ age = 15-10.

[c] N for Sighted group = 34, except for factor IQ's, where N = 33, and clay models, where N = 32. $\bar{X}$ age = 15-6.

The Tactile Embedded Test is scored in mean time, so that the lower the score the more articulated the performance. All other articulated measures are scored in the opposite direction; the higher the score the better the performance.

Table 2

Means for Retinoblastoma, Congenital and Sighted Groups, Adjusted for Haptic-Forms Proficiency

Tests	Retinoblastoma	Congenital[a]	Sighted[b]
Tactile embedded figures	59.7	130.5**	53.7
Tactile matchsticks	6.5	5.0	5.7
Tactile block design	16.7	12.3**	14.1*
Clay models	4.8	3.4**	5.1

[a]Probability values refer to Retinoblastoma vs. Congenital comparison.

[b]Probability values refer to Retinoblastoma vs. Sighted comparison.

*$p < .05$.

**$p < .01$.

assess this dimension they are superior to the sighted. Further, the retinoblastoma cases share with the congenitally totally blind a marked superiority, compared to the sighted, on tasks calling for sustained auditory attention. In verbal-comprehension ability, the third cognitive dimension assessed, the retinoblastoma group is superior to both the sighted and congenitally blind in tactile form discrimination.

The next phase of the study will evaluate subjects with unilateral retinoblastoma, to determine the effect of vision and to assess genetic similarities as reflected by cognitive functioning. A new form discrimination task is being designed to control better for this variable in analysis of the results on the articulation measures. The Auditory Embedded Figures Test is being reviewed to see whether a clear test of articulation

may be devised for this sensory channel. Further study of clay models as a measurement device is also planned.

Differences in cognitive style among known groups with specific genetic characteristics suggests hereditary aspects of specific intellectual abilities. The retinoblastoma survivors have provided an opportunity to evaluate such differences, and clinical observations have been supported in one cognitive dimension.

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Plate 1

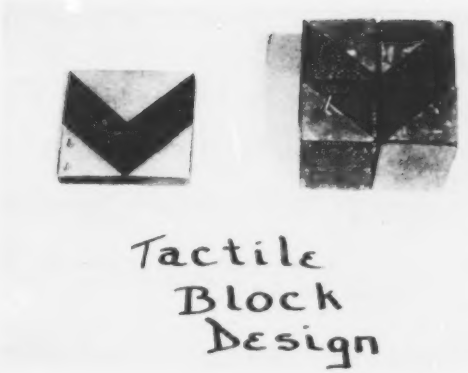

Plate 2

Plate 3

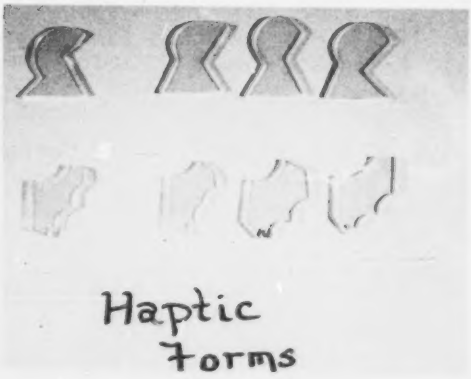

Plate 4

CURRENT APPLIED RESEARCH

SCIENCE CURRICULUM IMPROVEMENT STUDY

KITS ADAPTED FOR THE VISUALLY HANDICAPPED

Ross L. Huckins, Teacher

California School for the Blind
Berkeley, California

About 10 years ago the National Science Foundation gave generous support to the Lawrence Hall of Science at the University of California for the development of ungraded sequential physical and life science programs for the elementary school - programs which in essence turn the classroom into a laboratory. The aim is to develop in children the ability to weigh and sift evidence, remain open-minded, listen to ideas of others and then make decisions on the merit of evidence. In the Science Curriculum Improvement Study Kits, the center of attention in the classroom is not the teacher, but the materials with which each child is involved in discovery and manipulation.

The modern understanding of science rejects the idea that the scientist functions only as a camera. Instead it recognizes that what a scientist, or anyone for that matter, observes, depends as much on his past experiences and on the conceptual structure of his mind as it does on what is "out there" and what is in the mind of the observer. A quarter of a million children are using these kits.

About 2 years ago, Dr. Everett Wilcox, Supt. of the Calif. School for the Blind, contacted the Lawrence Hall of Science and Dr. Dan Johnson, Director of Special Education of Alameda County and together they obtained a Title 3 Grant of $100,000 for the period of 1969-1972, to adapt the SCIS kits so that they can be used by visually handicapped children in any public or residential school, whether there is one blind child in the class, or all of the class is blind. This is sort of a "piggy-back" project, taking advan-

tage of all of the experience and research that went into these kits. Many of these kits need very little adaptation for the blind.

These kits are developed because the ordinary public school classroom child is talked to and experimented for, resulting in entirely too much verbalism and too little experience. The SCIS approach is just what we need for visually handicapped and multihandicapped children. One of the added values of these kits is that the gifted blind child and the educationally retarded blind child can each progress at his own speed. Incidentally, if you happen to be in Junior High or Highschool work, these are ungraded kits, don't hesitate to use them.

The greatest adaptation needs to come in the teacher rather than the materials. The teacher must allow and encourage the blind child to experience and discover science principles for himself. One of the hardest things for a teacher of these materials is to keep from giving answers and doing for the children instead of allowing them to argue with each other and struggle to manipulate materials themselves. The teacher does not contradict a student, but asks other students if they agree and why.

You buy a kit with equipment for 32 children and order one or more packets of adaptions for the blind. We hope these all will be available on quota from the American Printing House. Each kit has a teacher's manual to help the teacher understand how to proceed. The adaptions in procedure that we feel are helpful to the teacher who has one or more blind children are written on translucent paper and inserted in the teacher's manual, to give the teacher confidence by knowing how other blind children have successfully used the materials.

This year we are working on four of these units. Three men from the S.C.I.S. study and myself are each using one of these kits with blind children and making adaptions we feel necessary. Then the rest of us give constructive criticism and then we use the kits with other groups of children. We have agreed to attack a problem with, "At this minute I don't understand how a blind child can do this," rather than saying "Blind children cannot do this." For example, the blind children had much trouble catching and tactually understanding guppies. Goldfish were substituted. The bottom of one square plastic fish bowl was punched (a hot nail pushed through in several places) and placed inside another like contain-

er, then filled with water, fish, etc. By slowly lifting the inner perforated container, setting it on an angle inside the other, the fish is in a small amount of water where he can be easily caught and tactually examined. Examining a large fish purchased from the market is also helpful. After familiarity with the goldfish, the children could then work with the guppies with understanding.

One of the units is called Relativity, not Einstein's relativity, but how the positions of objects are related to each other, using one or more reference points. The student manual has many pictures, making it seem too visual. We are successfully adapting some of these using "pop-ups" similar to those in greeting cards, valentines and children's books. Other puzzles and games are being thermoformed. One of the key figures in this unit is "Mr. O" an artificial observer. He is a large cardboard figure with buttons on his front and his right arm marked with sandpaper. "Mr. O" enables the children to start thinking of the relationship of materials to each other outside themselves; to look at things from the viewpoint of another. We begin with six simple directions: right-left, up-down, front-back; and close-far relative to each of these.

Because the child learns to accept responsibility for understanding and describing meaningfully the relative positions of things, this has excellent carry-over to mobility and orientation, geography maps, setting up arithmetic problems, crafts, working in a kitchen, etc. Just as these experiences are valuable for sighted children, they are invaluable skills for the blind child. When the teacher learns to answer questions with questions, instead of dishing out facts, the growth and self-confidence in the student is tremendous. The function of the teacher is to observe and listen to children and notice how they are progressing in their investigations and be a guide who leads children to see the relationship of findings to key concepts of science. Teachers are recognizing that experiments and investigations create interest, skills and concepts far beyond those achieved by the use of texts.

Some of our adaptions may seem to be unconventional. The test is what <u>really works</u> with visually handicapped and multiply handicapped children. When we give children an honest chance, and encouragement, they will discover the facts we are so anxious for them to learn, plus an appreciation of themselves and the opinions of others. Perhaps our children of today can learn better ways to

cope with our world.

For free information about these Science Curriculum Improvement Study Kits and their proposed adaptions, request Newsletter and other information from:

Dr. Herbert Thier
S.C.I.S.
Lawrence Hall of Science
University of California
Berkeley, Calif. 94720

TECHNOLOGICAL ADVANCES IN SENSORY AIDS FOR THE BLIND AT MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Vito A. Proscia, Director

Sensory Aids Evaluation and Development Center

The Massachusetts Institute of Technology Center for Sensory Aids Evaluation and Development was established under the direction of the late John K. Dupress on September 1, 1964 under a contract from the Department of Health, Education and Welfare, Vocational Rehabilitation Administration. The Director and Center staff are directly responsible to the Department of Mechanical Engineering at M.I.T. The small staff of the Center is supported by a highly qualified group of specialists; however, the chief support and guidance comes from Professor Robert W. Mann of the Department of Mechanical Engineering, who is Chairman of the Steering Committee and who plays a significant and energetic role in the Center's activities.

The purpose of the Center is to provide a technological and scientific facility which is responsible for the development, evaluation, and demonstration of sensory aid devices, and which directs itself to the solution of problems in sensory deprivation for the blind, multiply handicapped blind, and visually impaired in order to help this population of sensory handicapped to become independent, productive, and socially accepted members of the community. The Center realizes that the solution of these problems cannot be found solely in technology; therefore, a considerable effort is made to engage and cooperate with agencies and organizations concerned with rehabilitation, education, and services for the blind.

The scope and activities of the Center cover:

1. development, demonstration, and evaluation of sensory aid devices;
2. evaluation of new and innovative aids;

3. encouraging others to develop new aids;
4. production engineering of sensory aid devices;
5. in-house development of aids and devices for demonstration and field testing in cooperation with agencies;
6. development of evaluation procedures;
7. presentation and seminars in technological advances in sensory aids for the blind to universities and colleges, schools of special education, agencies for the blind, interest groups, etc.; and
8. cooperative programs with school systems, agencies, industry, and consultants.

The goals of the Center require the innovative capabilities of various professional disciplines. These goals are often sparked by the creativity of student thesis activity. Many of the ideas and devices brought to the Center have originated under the direction of M.I.T. professors and student involvement and participation. It was through the initial participatory theses programs that the professors at M.I.T. realized the need for a "Sensory Aids Center," since the work conducted by the students could be carried on by professional personnel and appropriate resources. From this parochial beginning, the Center has grown and developed into a facility which is providing beneficial implements and products for the blind of our nation and abroad.

The main thrust of the Center is to advance the field of communications for blind, deaf-blind, and low vision persons and to enhance mobility and orientation techniques through the use of state-of-the-art technology and evaluative field tests. Much effort and attention has been given to braille computerized programs and braille output devices in order to make braille copiously available to the blind as a useful communication medium. The projects concerned with braille have emphasized M.I.T.'s basic philosophy of "making braille as accessible as print."

The MIT High-Speed Braille Embosser, known as "BRAILLEMBOSS," which originated as a student thesis project, has been redesigned and is presently being made available in limited quantities for distribution to select users. This project was sponsored by a grant from the Hartford Foundation and has been successfully completed as of June 30, 1970. The BRAILLEMBOSS terminal has already been recognized as a useful, remote, interactive braille output device. Three (3) braille terminals are actively exercised in as many computer environments in the Boston area. The

first has been on-line with two (2) separate time-sharing computer systems at MIT's Computation Center, the 7094-CTSS system and the IBM 360/67 computers. The second has been extensively utilized since October 1969 as a demonstration project by a blind mathematician employed at NASA's Electronics Research Center in Cambridge, Massachusetts. The third BRAILLEMBOSS was installed at the Perkins School for the Blind in Watertown, Massachusetts in February 1970 and is presently being demonstrated as a braille output teaching aid for high school students engaged in learning programming on the G.E. time-shared computer network. The installation of these devices has been straightforward and easily accomplished. Inkprint is immediately converted into braille via a combination of a BRAILLEMBOSS slaved to a standard TELETYPEWRITER which in turn is connected to the appropriate computer system by telephone lines. This means that an interactive braille system can be readily installed in any desired or needed location by use of the above equipment for purposes of education and employment.

Another successful demonstration program, conducted under the direction of the Center, took place in Fall 1968. This project resulted in the production of a braille novel, The East Indiaman, by Ellis K. Meacham, simultaneously with the new inkprint issue. This investigation determined the utility of compositors tapes, which are used to print inkprint material, as the input media to a braille translation program. The project was held in cooperation with the Library of Congress, the American Printing House for the Blind, Poole Clarinda of Chicago (printer), Little Brown & Company (publisher), IBM, the Social and Rehabilitation Services (HEW), and coordinated and managed by the Center.

Several forms of computerized Grade II braille translation programs exist in various states of completion and format. The two sophisticated programs currently being utilized are housed at MIT's Computation Center and the American Printing House for the Blind in Louisville, Kentucky. DOTSYS, located at MIT, functions as an experimental time-sharing program, whereas the braille translation program housed in a dedicated computer at APH is a batch processing production system and has produced many hundreds of books for general consumption. Both DOTSYS and the APH Grade II translation system are unique to their particular computer environment and would require considerable effort and expense to transfer to other computer systems. With this notion in mind and in keeping with our basic philosophy of making braille more accessible, the Center contracted with the MITRE Corporation of

Bedford, Massachusetts to investigate and develop a computerized Grade II braille translation program which would be transferrable to major computer systems. The MITRE Corporation developed DOTSYS II in a higher level language, "COBAL," which is considered to be transferrable to most of the major computer systems containing COBAL capability.

A further extension of this program has resulted in an agreement with the Atlanta Public School System for the delivery of DOTSYS II which is to be incorporated in the IBM 360/50 computer. This system will be utilized to produce braille educational material by batch processing methods. Plans are currently underway to expand the DOTSYS II braille translater to include an interactive braille system in order to utilize the MIT-BRAILLEMBOSS. Upon completion of this program, DOTSYS II will be made available to users who have a need and requirement to generate literary braille.

The scope of the Center's activities is broad and the problems we attempt to solve are difficult. An example of this is the work the Center is pursuing in overcoming an important communication problem involving the deaf-blind. The Industrial Home for the Blind in Brooklyn, New York brought to our attention the need for a fire alarm and doorbell communication device to be used in selected or confined areas by the deaf-blind. The previous devices developed for this specific task proved to be unsatisfactory. The Center took it upon itself to devise and develop a communication system which would be suitable for the requirements set forth by the IHB.

It was required that a vibro-tactile, portable device, which would be carried on the person, be designed and implemented. A battery operated receiver with a vibro-tactile display was designed and built. The communication link utilized induction transmission principles. A transmitter (or sender) was connected to wire loops which determined the coverage zone. The signals emitted from the loops energized the receiver, which was neatly tucked in the individual's pocket. This system was demonstrated to the IHB and was accepted as a possible solution to the fire alarm and doorbell requirement. In cooperation with IHB, National Center for Deaf-Blind Youths and Adults, this system will be evaluated in the forthcoming months.

It is envisioned that the pocket communication system, now known as "TAC-COM," has many uses for the deaf-blind. Projected in-

vestigations for the use of TAC-COM are:

1. end of line indicator for braillewriter and typewriter;
2. telephone indicator;
3. auditory cue indicator;
4. ambient or artificial light indicator, etc.

The art of advancing the mobility of the blind through use of devices has not progressed rapidly. The age-old cane and the assistance of a guide dog are still the two basic modes of travel aids. Since blind people are interested in becoming more mobile and less conspicuous in their travels, several projects have been underway at the Center to meet these goals.

A significant achievement of the Center has been realized by the recent manufacture of a highly reliable folding cane. HYCOR, Incorporated of Woburn, Massachusetts is manufacturing and offering for sale a replica of the MIT-design folding cane. The manufacture of the cane evolved from a student thesis project, further developed at the Center, evaluated and field tested through the crook-handle folding cane, and eventually arriving at the straight-handle folding cane. The manufacture was made possible through a subsidy of the non-recurring tooling costs by the Northwest Foundation for the Blind.

The cane as a travel aid is an adequate device for mobility of the blind. However, if cane travel techniques were supplemented by an electronic device, that is, a device that is inconspicuous and which will protect the blind traveller from objects which cannot be detected by the cane, it would then give the traveller a greater sense of security and a larger margin of safety. The PATHSOUNDER is an exploratory electronic device being extensively evaluated at the Center to investigate these concepts. The PATHSOUNDER is an ultrasonic radiating device which rests on the chest of the user by a strap suspended from the neck. The radiated ultra-sound beam which lies directly in front of the traveller, detects objects between the waistline and the forehead. The device warns the user of objects in his path and protects him from severe collisions. Several agencies are presently cooperating with the Center in field test evaluation programs. PATHSOUNDERS have been distributed and are being tested by the New York Association for the Blind, the Greater Pittsburgh Guild for the Blind, the Veterans Administration, and independent travellers.

The most current participatory program is a committment and exploration of closed circuit television as a low vision aid. This program is being conducted in cooperation with the Massachusetts Commission for the Blind through Mr. Philip J. Davis as Chief Investigator of the project, the Boston University Low Vision Clinic, and MIT students. Five (5) "VIDEO-VISION" systems will be delivered to the B. U. Low Vision Clinic by early Fall to be evaluated by patients under the direction of ophthalmologists. It should be understood from the outset that the VIDEO-VISION system is considered to be a supplement to other low vision aids. The clinic requires the patient to test, utilize, and familiarize himself with the approved low vision aids before introducing the television system. In addition, the participants in this program believe that the analysis, evaluation, and prescribed television devices be controlled by the staff of the Low Vision Clinics. The goals of this program are to develop a production engineering model to be used as a reading aid which is economically reasonable, costing less than $1,500.

The essential element of recent successes of the Sensory Aids Evaluation and Development Center is cooperative effort. It is through cooperation, communication and education that the fulfillment of our goals can be realized together.

TECHNICAL RESEARCH AND DEVELOPMENT AT THE AMERICAN PRINTING HOUSE

Virgil E. Zickel

American Printing House, Inc.
Louisville, Kentucky

I believe it appropriate to begin this report on technical research and development at APH with a review of the print-to-Braille translation project using a computer.

From the beginning of this project some 15 years ago it was felt that the use of the computer for translation would have several advantages. For example, it should shorten the time required to convert the inkprint copy into Braille plates, it would lessen the need for a vast number of skilled Braillists with their many years of training and it was also hoped that the cost of Braille produced in this manner would be appreciably less than that produced in the conventional way.

In 1965 an IBM 709 computer was installed and some Braille plates were produced that first year. Since then the volume has increased steadily and a report for the calendar year, 1969, indicates that a little less than 50,000 plates were translated and embossed during that period.

While we have known for several years that late model computers capable of translating Braille more efficiently were available, we appreciated having the 709, knowing that it was installed as an experiment to enable us to learn if a computer could actually perform the translation of print to Braille. However, it is a pleasure to inform you that we now have an IBM 7040 replacing the 709. While the installation of this machine has been underway for several months and in partial operation for approximately a month, using some of the 709 off-line equipment, the entire 7040 system is now operational. There is very little difference in the speed of the two systems; however the 7040 through its solid state circuitry is far more dependable and less sensitive to

temperature changes. Actually, the fragility of the 709 was the prime reason so few magazines were scheduled for translation by the computer. Down time was such a large factor that we found it hard to maintain the tight schedule magazines require. It is a little early to make sound predictions but it appears that maintenance may now be less than 25% of that with the older machine. With the 7040 we expect to translate a total of 75,000 plates during the calendar year, 1970.

I am sure that most of you are familiar with the book, *East India Man* which was translated using the inkprint publisher's compositors paper tape as input. This experiment was sponsored by the Library of Congress and done in cooperation with M.I.T. While it proved that compositors tape can be programmed to supply the input to the computer, it also pointed out some of the many problems that would have to be resolved to make this a practical procedure. To list a few: typesetting procedures vary from one company to another with some actual variations in the codes, the normal time lag between type setting and the selection of a book for Brailling would make it necessary that all tapes to be collected and cataloged for possible future use but probably most important is that many typesetters make corrections in the metal and not the tape therefore making these corrections necessary manually at the time of translation.

In our search for other means of input, we are encouraged with the prospect of optical scanning. We have been in contact with two companies who are interested in supplying us magnetic tape obtained from the printed book by optical scanning and one has made a firm quotation from which it appears that optical scanning might eliminate a vast amount of keypunching. While it is a little early to make a definite statement, the prospect is most encouraging.

In cooperation with Shack Associates, we learned of another development which may have a profound effect on the translation of Braille music. It has been learned that the music publishers have developed a code for use with perforated tape or cards to control music transcribing equipment. Since one of the major problems in translating Braille music is coding the printed sheet, the use of these tapes would eliminate this problem. The actual translation into Braille is still a problem; however, this appears to be straight forward, requiring only time and money. Since Braille music transcribers are becoming fewer and fewer and the

demand for music is increasing, we plan to pursue this idea further; hopefully it will provide the means for meeting the great need for Braille music.

The Printing House now has the Science Measurement Kit ready for distribution. While this is not actually a technical development I hope that it will be of interest to you . This kit includes a number of items available from commercial sources that have been adapted for use in teaching science to blind students. Included is a spring or dial balance, a pan balance and a thermometer. Also included is a new one-foot ruler made of molded black styrene, graduated from left to right on the upper edge in centimeters and on the lower edge in inches so that the conversion from metric to English scales is readily accomplished. The ruler is 1/4" thick in the center tapering down to approximately 1/16" on the edges and for all practical purposes it is unbreakable and very accurate.

The spring balance is graduated tactually in grams with some key points in ounces. The pan balance is a standard model, quite rugged and supplied with the necessary metric weights. The thermometer is a commercial instrument adapted for reading tactually, with raised lines in 10^{o}F. intervals, and the freezing point and the boiling point marked with large Braille dots. Various other pieces of equipment are provided including overflow and catch cans, and an electrical heating unit along with the appropriate blocks for indicating weights and volume.

For approximately a year, APH has manufactured a solid state variable speed control for use with tape or record play back equipment. This device has been very popular. Actually over 1,000 units have been produced, and both the Sony 105 and the APH reproducer can be supplied with this control.

The new APH talking book reproducer has been available for several months and it has also been very well received. This machine has an unusually light pickup arm with a stylus pressure of only 3 grams that completely protects the record from accidental damage by the needle. The amplifier is of the latest solid state design with an output power of 2 watts.

Research and development has been under way for some time on the model of a special phonograph reproducer utilizing the stereophonic pickup with a special tone arm and turntable which allows

the user to play a record at 8-1/3 r.p.m. or to scan at 66-2/3 r.p.m. It is unusual in that it can move forward, stop or move backward at either speed without damage to the needle or tone arm. Also a photo electric cell located in the tone arm detects bands on the record and audibly indicates where they occur.

Our tests have indicated that the design is sound and four more of these machines are now in production. I am sure you are wondering what we plan to do with this unusual gadget.

Actually for some time APH has been interested in the use of recorded text material for handicapped children. As long ago as 1963 we published a number of recorded texts including the Adventure Series; Adventures of the American People; Adventures for Readers, and several others. This, however, did not prove to be very popular.

In searching for a reason for this lack of popularity we are reminded that a child studying a conventional text may stop at a place of special interest, or a passage that is difficult and reread a part of the material. He may also refer to the index, read a footnote or refer to another page in another chapter.

All of these can be accomplished through the use of the special reproducer referred to. For example, the chapter heading and page numbers could be carried on the record track or side of the stereo groove permitting rapid access, using the high speed scan. When the desired page is located the machine is returned to the reading side of the groove and played at the slower speed.

Some sample material has been recorded and tested along with a Braille supplement.

When the additional machines are completed formal testing of the material will begin.

The idea has so many possibilities that development of the material will be a major project. However, the new machine, plus the special material suggests an exciting future for the use of recorded text.

PRE-SCHOOL VISION & HEARING SCREENING &

NURSERY SCHOOL PROGRAMS FOR VISUALLY HANDICAPPED CHILDREN

J. Kirk Walter
Project Director & Coordinator of Visually Handicapped

Northwestern Illinois Association
For Hearing, Vision, and Physically Handicapped Children
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The Illinois State Legislature has charged the local school districts with the responsibility of educating visually handicapped children beginning at age 3. This legislation became effective July 1, 1969. To date only one class devoted entirely to preschool visually handicapped children has been established. This class is housed at the Winnebago Center for the Blind in Rockford, Illinois. The class is paid for by Rockford School District #205 and supervised by the Northwestern Illinois Association Coordinator of Visually Handicapped. How these children were identified and the class developed is a long but exciting story.

In 1968, the State of Illinois was awarded a Title VI-A Grant to be utilized in the area of identification, diagnosis, and evaluation of preschool children, ages 3-5, who may have a hearing, vision, or orthopedic impairment.

In turn, these grants were awarded to various projects within the State of Illinois on a competitive basis. It became obvious that this money could be more effectively spent by developing regional programs, using a minimum school population base of 200,000 as a criteria for a region.

Illinois now has sixteen regions ranging in size from less than a county to as many as eighteen counties. Illinois is more heavily populated in the north than in the south and thus there are more regions in the north.

In some regions the Title VI Project is an entity unto itself, while in others it is a part of a more complex joint agreement. This is the case with the Northwestern Illinois Association for Hearing, Vision, and Physically Handicapped Children.

The Northwestern Illinois Association was originally a Title VI program functioning strictly at the preschool level. Superintendents and Special Education Directors soon realized the value of the identification procedures in future planning of classrooms and staff. As a result of an assessment to each school district, the Northwestern Illinois Association was able to hire educational consultants in the areas of hearing and vision and will soon have a consultant in the area of orthopedic-health impaired. These educators act as coordinators and consultants to each of the school districts.

The Illinois Department of Public Health also acknowledges the value of regional planning and assists various regions in their preschool screening. This assistance is in the form of training technicians and providing financial assistance. The screening technique, criteria, and instruments are all approved by the Joint Committee on Optometry and Ophthalmology, the Illinois Department of Public Health, the Illinois Society for Prevention of Blindness, and the Office of the Superintendent of Public Instruction.

As a result of these additional funds and cooperation by 104 school districts, the Northwestern Illinois Association is able to provide coordinating services to children ages 3-21 in a nine county area. Involvement with the school districts means that each certified employee is eligible for special education reimbursement from the State Department of Special Education. Thus the Northwestern Illinois Association is a multiply funded association dependent on federal, state, and local funds for its continued growth and development.

The preschool screening and development of educational programs follows a systematic but yet very flexible pattern in an attempt to meet the individual needs of each community. The Project Director and the Supervising Technician plan the areas in which screening will take place. Once the Regional (County) and District Superintendent of Schools have been notified, a local volunteer agency, such as church groups or women's clubs, is contacted and asked to cooperate in the screening program. The

Supervising Technician then meets with the volunteer group to discuss the screening process and the vital role played by the volunteers. The success of the screening program depends largely on the ability of the volunteer group to "round up" large numbers of children.

Two different vision screening instruments are available. Our technicians prefer the Michigan Jr. Screener, especially with very young children and Head Start groups. Technicians in some programs prefer the Titmus Vision Screener. Both are approved for the screening.

The hearing technicians follow the procedures recommended by the United States Public Health Service and screen at the following frequencies: 500, 1000, 2000, and 4000 Hz at a hearing level of 25 dB (ISO).

A child is considered to have "failed" the screening if he:

a. fails to hear any two tones at 25 dB in the same ear.
b. fails to hear any one tone at 35 dB in either ear.

The volunteer group is responsible for spreading the word so that every child may be screened. The Northwestern Illinois Association assists in this publicity by providing each volunteer group with samples of publicity and especially prepared pamphlets. In the larger cities the children are pre-registered a week in advance so that they will not all arrive at the same time on screening day.

On the screening day the volunteers are ready to do their part and the certified screening technicians set up their instruments prior to the arrival of the children. The children either pass or fail the screening and no attempt is made to determine visual acuity or hearing level. If the child fails the screening, he is then asked to return in two weeks for a rescreening.

In the event that the child fails the rescreening, the parents are then asked to contact an eye doctor so that their child may receive a full ocular examination.

Usually a visual loss can be corrected. There are times, however, when the child's vision loss is great and little, if any, correction can be made. Now is the time when the parent and the

child need all the help and understanding that they can get.

The eye doctor explains to the parents the various agencies and organizations that can assist the family.

Although there are friendly people waiting, the family's first visit to an agency may be full of fear and apprehension.

The executive director of the agency and the Northwestern Illinois Association Regional Coordinator of Visually Handicapped explain to the parents the concept of regional planning and how it brings together the resources of many areas to meet the individual needs of the child.

The parents and child are then introduced to the Nursery School teacher and a few of the many trained volunteers. A volunteer introduces the child to some of the other children while the parents and teacher discuss the progress the child has made thus far, including toilet training, eating habits and skills, likes and dislikes, as well as fears and abilities.

The teacher then describes a typical day at the school. When the children arrive they are encouraged to learn to descend the stairs first with assistance and then independently. Each activity at the school is designed for two purposes, for fun and to develop greater independence. Parents are encouraged to continue the activities and increase independence learned at the school.

For many visually handicapped children the main ingredient that is missing is fun. An obstacle course is fun for the child but serious business as far as the school is concerned. In addition to the basic skills of climbing crawling, jumping, sliding, and balancing, the child learns basic terms and concepts such as up, down, in, out, push, and pull. Tieing a shoe or putting on a coat and similar activities can also be part of the obstacle course.

It is extremely beneficial for the students to be exposed to orientation and mobility skills at an early age. Finding Potato Man is not only a game for the children but an excellent means of developing sound localization. Potato Man makes a loud ticking noise and is hidden by the teacher, a volunteer, or a child. When Potato Man starts ticking, the teacher calls out a child's name and the child attempts to locate Potato Man before the tick-

ing stops. At a later date the sound localization skills developed through the use of Potato Man and other games will become an important part of the student's travel both indoors and outside.

Each morning roll is called. This is done not only for attendance purposes but so that the volunteers will have a chance further to identify children by name. Roll call also helps to bring order to the day.

While most of the school program is devoted to learning through having fun, there is always time for a serious moment. A United States flag consisting of different textures for each color or shape is shown to the children. While some are able to see the flag with their eyes, others must use their fingers which will act as their looking glass to the world for the rest of their lives. Now is the time to begin training to develop greater tactile discrimination.

Each morning the children salute the flag and say the Pledge of Allegiance. It may not mean much at first but gradually through meaningful discussions by the teacher, volunteers, and parents, these and other activities will become more meaningful.

Singing is a fun activity too. But once again there is a reason other than fun for this activity. Rhythm and balanced body movements are ultimate goals. The abstract lyrics of some songs help to expand the thinking and reasoning of some of the students. Other songs tell of our country's history, climate, or geographical locations.

Volunteers are used extensively in the program so that the teacher may spend her time in observing the children's progress and making appropriate suggestions.

A child who is blind enjoys a good story as much as any one, especially if the time and effort is made to be sure that the child understands the story. This may be done by explanation or through tactual exploration of an object similar to the one described in the story.

The children enjoy painting and soon learn that it is another form of self-expression. The children who have some vision enjoy painting with a brush as well as finger painting. All of the children find finger painting delightful and look forward

to it.

The children are kept busy either individually or in groups. Marching to an activity record helps to develop the concepts of jumping, running, skipping, walking, and hopping.

Every effort is made to insure that the children do not overtire. Unfortunately many visually impaired children are not used to normal activity and they tire very easily. At mid-morning a rest break is called and each child spreads his mat on the floor.

During this ten to fifteen minute rest period, one volunteer remains with the children while the teacher and the other volunteers go to another room to discuss the day's activities thus far and any problems which may have arisen. As a result of such discussions, adjustments can be made in the day's program.

The children's health and safety is always of first importance. Each volunteer is instructed in proper fire drill procedure. This procedure as well as the building has been approved by the fire marshal's office.

The teacher is the last person to leave after she has looked in all side rooms and under tables. Some of the children either cannot or have not learned to walk as yet. These children are carried out by the volunteers. Once outside the building caution is observed since police and fire equipment will be arriving.

Each year the children visit the fire department or at least see a fire truck. In addition, firemen explain the importance of fire drills.

A respect for fire, not a fear, is instilled in the children. A calm, relaxed atmosphere is maintained throughout the fire drill so as not to upset the children. Once the fire drill is over the children return to their classroom.

Water is an interesting phenomenon for blind children. For some, perhaps due to an unfortunate incident, water is something which is feared. Other children find water a delightful experience. In an attempt to overcome a child's fear of water, play activities are developed to meet the child's individual needs.

A small plastic swimming pool is used somewhat in reverse. The

child remains outside the pool while his toys and water remain inside the pool. As the child develops confidence he is introduced to running water in a sink and flushing the toilet. Pouring water into a cup or pail may be fun for the child but his experiences in the pool will soon be transferred to his table skills and pouring milk or juice.

Juice and cookies are always an event to look forward to. It is not unusual for a child entering the program to be unable to feed himself. The teacher and volunteers teach the children to feed themselves and to drink from a cup or glass if they cannot already do so. Here again parents are encouraged to continue at home activities developed at school.

With the coming of warmer days the classroom moves outdoors. The swimming pool takes on a new dimension. By the time fall comes around these children will be used to water and will be ready for the large swimming pool at the local YMCA or YWCA. This gradual introduction to water activities will have resulted in a child that is ready to learn to swim.

Other outdoor activities include walks in the park, playing on the swing set, and field trips. In the spring the children plant seeds and watch them grow. The fresh air and sunshine also contribute to the child's health and development.

The teacher, director, volunteers, and Northwestern Illinois Association Coordinator of Visually Handicapped hold periodic conferences and staffings. During these conferences major changes in program are discussed. When a child has demonstrated that he is capable of functioning in an integrated situation, he then enrolls in a regular nursery school or kindergarten program. The Coordinator of Visually Handicapped makes advance preparations for the child by discussing the proposed change with the parents and the new teacher. Depending on the child's needs, the coordinator will recommend either gradual or total integration or else he may recommend visits by an itinerant teacher.

During all of this time the State Consultant for Visually Handicapped is kept informed of the child's progress and needs. She in turn may make recommendations to the Coordinator of Visually Handicapped who will attempt to implement these recommendations locally.

The Northwestern Illinois Association is less than two years old and yet its impact in the state's second largest city, Rockford, as well as in Pearl City whose population is less than 500, has been felt. This fall the Northwestern Illinois Association will open its first audiometric facility for hearing evaluations beyond the screening program. Plans to secure a psychologist skilled in testing children with hearing and vision impairments are being made. The staff has grown from one member in the fall of 1968 to thirteen members by the fall of 1970.

Regional programming has a great deal of merit and is worthy of consideration by any state. I thank you for your time and patience in learning of this program and hope that you will attempt to utilize not only the concept of early education for children who are visually handicapped, but also the importance of early identification of children who have a vision or hearing loss so that perhaps they will never need the services of the special education teacher.

READING READINESS MATERIALS

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These materials will be discussed in terms of their value as aids in preparing visually handicapped children for the task of reading braille. Some of the aids were not developed specifically as reading materials, but, rather as general readiness aids. Therefore, they are suitable for use in several different academic areas. This paper will be restricted to a discussion of the use of these aids in reading.

The first two items, the Simplified Block and the Peg Frames, were developed as a result of urgent requests by teachers for readiness materials which were very basic and elementary, and aids which could be used by children who were functioning at levels so low that the readiness materials now available were not suitable for their needs. These needs became known as the result of a study which is being conducted by Mrs. Fay Leach of the American Printing House for the Blind. The study is entitled "Survey of the Educational Needs of Multi-Handicapped Visually Impaired Children". Some of the results indicate that it is imperative that these children be provided with concrete experiences and materials which are especially designed for their needs. This is true, of course, for all visually handicapped children, but it is particularly relevant to the education of multi-handicapped children. The study mentioned above also indicates that educational materials used with these children should emphasize a multi-sensory approach. That is, materials should be designed so that more than one sense is involved in their use. They should also be multi-purpose materials and be capable of being adapted in a number of ways. Further, they should be highly motivating, incorporate the learning of basic skills, and should focus on the development of communication and

language. Obviously, all of these attributes are desirable, and necessary, in educational programs for pre-school visually handicapped children. This is the reason for including the two aids mentioned above in this demonstration. It should be stressed that these are prototypes and are not completed models. They have not been fully evaluated in terms of their effectiveness as readiness materials for visually handicapped children.

SIMPLIFIED BLOCK

This large block is designed with different colors and textures on each side, and with a frame into which it can be fitted easily. The frame is designed so that a very young child, or a child with multiple handicaps can fit the block into it with very little difficulty. Accompanying the block and the frame are squares of materials of different colors and textures which can be matched with the sides of the blocks. The block and frame can be used alone, or several sets can be used together to form patterns which the child can duplicate or develop from memory. The frame is backed with a material which causes it to adhere to any surface. Therefore, the child is able to work with the block and frame without the problem of having the frame slip out of reach.

Some of the purposes for which the Simplified Block can be used are as follows:

1. It can first be used as a toy, to be played with and manipulated in the same way any child would play with a block.

2. Development of gross motor dexterity

   a. The block has sufficient weight and is of appropriate size to be used in developing grasping ability.

   b. The different sides of the block can be examined for identification of textural differences. An activity such as this will help to develop the ability to discriminate tactually and can also create an awareness of the differences in different types of materials.

c. The turning of the block for correct position in the frame strengthens the hand muscles and promotes manual dexterity.

3. Sensory Development

a. Visual - The three colors of the sides of the blocks can be matched in various ways by children with enough vision for this purpose. This activity will aid in the development of color identification and discrimination.

b. Tactual - The various textures of the sides of the blocks can also be matched as a means of developing the ability to discriminate tactually and to identify different kinds of textures.

4. Cognitive Development

a. The concepts of "same and different", or "like and unlike" can be developed in activities involving the different colors and textures of the sides of the blocks.

b. Memory sequencing can be developed by having the child reproduce or recall the sequence of colors or textures from patterns set up by the teacher. Some children may be able to create patterns of their own.

c. Number concepts can be taught when the child is ready for this type learning experience.

The Simplified Block can be used as a "reading readiness" aid in conjunction with other similar aids. As has been suggested, possibilities exist for its use as a readiness aid in the areas of mathematics, graph reading, or in any instance where the ability to read raised line illustrations is required.

PEG FRAMES

The Peg Frames consist of three frames of varying sizes which have holes of varying sizes. The first frame has one large hole, the next has two smaller holes, and the third has three

holes which are even smaller. The pegs which accompany the frames are varying sizes also, in order to fit the different-sized holes. These pegs have enlarged tops so that they can be grasped more easily by children who might have difficulty with muscular control. Each of the frames is backed with material which causes it to adhere to any surface. Therefore, the frames stay in place while the child manipulates the pegs.

Some of the purposes for which the Peg Frames can be used are as follows:

1. At first, they can be used as toys which will aid the child in learning to manipulate objects and, also, make him aware of differences in sizes and shapes of objects.

2. The child will begin by using the large frame and will gradually learn to use the smaller frames. These frames will give him practice in putting objects in and taking them out of holes. This activity will develop manual dexterity and, also, grasping ability.

3. The inside of the holes in the frames is painted in a contrasting color to the rest of the frame. Therefore, for children with some useful vision, the peg frames can be used in developing color discrimination.

4. When the child is ready, the beginning concepts of counting can be taught with the peg frames.

The next two items, the Textured Blocks and the Peg Wagon, were developed in conjunction with a study which was conducted by Miss Carol Halliday and which resulted in the publication of the booklet entitled *The Visually Impaired Child: Growth, Learning, Development-Infancy to School Age*. Again, it must be emphasized that these materials were not developed specifically as "reading readiness" aids. However, they are extremely suitable as aids in the development of the various skills which will be needed by a visually handicapped child as he learns to read. This child may become a reader of braille, which means that he will be required to use his fingers and, thus, his ability to discriminate tactually can best be developed by practice. This entails first, doing things with the whole body, then with the arms and hands and large muscles, and later doing finer things which strengthen the fingers and make them more flexible and

sensitive. The child with enough vision to use large print will need some of the same kinds of activities in order to develop the skills necessary to learn to read. He will need to develop the ability to discriminate visually and to identify likeness and difference in various types of materials. He will also need to develop physical coordination and a satisfactory degree of eye-hand coordination.

The Textured Blocks and the Peg Wagon are suitable for children who are functioning at a higher level than those using the Simplified Block and the Peg Frames. They might, in fact, be used as the second step in the development of braille reading readiness; with the Simplified Block and the Peg Frames being the first step. The materials were not designed with this sequence in mind, necessarily, but a resourceful and creative teacher could certainly develop a reading readiness program beginning with the sequential use of these aids.

TEXTURED BLOCKS

The purpose of the Textured Blocks is to develop tactual awareness, to develop the ability to discriminate, and to give the child opportunities to perform various cognitive tasks. Some suggestions for using the blocks to develop these abilities are as follows:

1. At first, use the blocks simply as blocks to be played with. They can be given to the child in a small box and he can be encouraged to rattle them, take them out, lay them on the floor or table, put them back into the box, or hand them to someone. He can also carry them in various types of containers and the sound differences can be pointed out to him.

2. The different colors of the sides of the blocks should be called to the attention of children who have any useful vision. One or two colors should be pointed out at a time, since the identification of several different colors at one time would be confusing.

3. The concepts of size and shapes can be introduced to the child, gradually. He can be taught to find the small blocks, large blocks, etc. The shapes of the blocks, "cubes or squares", can also be pointed out to him and compared with other objects in his environment.

4. Qualities of the various textural surfaces should be discussed in terms of "rough", "smooth, "rougher than", "soft", etc.

5. Matching, in terms of texture and color, can follow these activities. Eventually, the child can learn to copy patterns made by another person, and some children may learn to make patterns of their own.

6. Tangible counting can be begun at whatever point the child shows interest and is ready to learn this concept.

PEG WAGON

The Peg Wagon Provides the child with slightly more refined tasks of taking out and putting in, grasping, etc., than the Peg Frames. It can actually serve as an extension of the Peg Frames, since both aids are based on the simple pegboard idea.

Some suggested activities to be used with the Peg Wagon are as follows:

1. At first, especially with very young children, it can be used simply as a toy, without the wooden slides and pegs. It can be pulled or pushed with the handle off or on. The very young child will probably want contact with the whole wagon at first and, therefore, the handles should be off. The wagon can be filled and/or emptied as an additional activity.

2. Both sizes of pegs can be used separately from the peg-inserts. They can be rolled in the tray; put in and out of containers; discussed in terms of color, size, and shapes; and eventually counted.

3. The three-holed insert should be placed in the wagon first, with the pegs already in the holes. The child will usually learn to remove the pegs first, and will later learn to replace them. He can eventually learn to count the pegs as he removes and replaces them.

4. Next, the child can be introduced to the six-holed insert. Obviously, this task is more difficult than using the three-holed insert, since the holes are

smaller and more pegs are involved. In the beginning, the child will find the removing of the pegs from the holes easier and of more interest. Later, with practice, he will be able to replace them.

5. For most children, the six-peg insert will be the first introduction to a group of six. Much later, the braille reading child will learn that the braille cell can contain as many as six dots. With this board it will also be possible to develop the child's understanding of rows, both down and across, which is necessary in learning braille.

6. The Peg Wagon can also be used in developing the concept of counting. For example, from all nine pegs the child can select the six pegs which fit one board and the three pegs which fit the other board.

7. In all activities involving the use of these materials, the child should be encouraged to make any visual observations possible.

Interspersed with all the activities suggested for use with these four aids, the child should have time for free play with the materials. He should be encouraged to play with others, using the materials. The teacher should be creative in her use of the materials and should encourage the child to be creative also.

The use of the aids is not necessarily limited to the child who will be reading braille. It should be stressed that the child who seems to have any useful vision, at all, should be shown how to use it and should be encouraged to do so. Any indication of visual interest and awareness on the child's part should be developed.

These materials can also help the child expand his vocabulary as he uses them in the various activities suggested above. The teacher should talk to him in simple, meaningful, broadening terms and encourage him to use these terms independently. Through the use of meaningful vocabulary, the child will learn to think and do.

The final set of materials we would like to discuss is the *Braille Reading Readiness Manual - To Be Used for the*

Development of Dot Perception, which was developed by Dorothy and Forrest Goodenough of the Texas School for the Blind, Austin, Texas. This manual consists of (1) four volumes of braille exercises for students, (2) instructions to the student to accompany each braille exercise, (3) explanations to teachers and/or parents who will be using the materials, and (4) lists of labels to be used as aids in dot discrimination.

The manual was designed to meet the needs for readiness materials for students who are preparing to learn braille. The entire manual consists of four books which can be used so that the preschool child can be introduced to dot perception in Book I as early as three or four years of age and progress to the other books as fast as his ability will allow.

Since one of the difficulties in braille reading is the problem of following a line of dots from left to right across the page, rows of flocking (or raised thermoform patterns) are used above and below the dots to help the student develop the ability of following a line of dots, as in reading braille.

In Book I, only one dot to a cell is used at all times. The student is not introduced to the term "cell" in reference to braille in this volume. The use of only one cell allows for greater ease in recognizing the grouping and the relative positions of the dots. The plan used in Book I is based on two developmental stages:

1. Exercises which deal only with the horizontal spacing of the dots, with recognition of the open spaces and the varied groupings of dots.

2. Exercises to develop recognition of the vertical position of the dots in the cell. Dot numbers are not introduced to the student at this time, but the position of the dot is identified as high, middle or low.

In Book II, only two dots are used in a cell. Tactile discrimination is developed by introducing the more complex characters very gradually. The student is asked to discriminate in two basic ways:

1. To determine the relative position of dots within the cell; whether they are arranged vertically, diagonally,

or horizontally. To do this, the student indicates whether the dots are straight up and down, top first, top last, or side by side.

2. The student indicates the proximity of the dots by saying whether they are *close* together *or apart*.

Since dot discrimination is easier when the dots are not too close together, the sequence is planned to introduce dots which are not in closest proximity first.

In Book III, the child learns the *numbers* of the dots and their position in the cell. (This is explained to the teacher in Book II). For the first time, three and four dot combinations are introduced, in addition to the combinations introduced in Book II. The more easily perceived two and three dot symbols are used in the first part of the book, and the more complex four dot characters are reserved for the last part of the book. In order to condition the student to the idea of horizontal reference rather than vertical in determining the position of the dots, the use of the guide lines above and below the dots is gradually eliminated.

In Book IV, all guide lines above and below the dots are eliminated. The most complex combinations of dots to discern tactually are introduced in this volume. The student is required to identify the numbers of the dots in each character, but at no time is he expected to name the character itself:

Research has shown that two factors play an important part in the difficulty of recognizing braille symbols: (1) the greater the number of dots in the symbol, the more difficult it is to identify, and (2) the consecutive use of multi-dot symbols makes recognition more difficult. To help minimize these problems, the space between characters and between lines of braille are gradually reduced in order to prepare the student for the reading of braille as it is normally presented. Accordingly, the first part of Book IV makes use of five and six dot configurations and the second part uses these new symbols in conjunction with those previously learned.

The manual contains no specific instructions regarding braille reading techniques. The authors suggest that, in order to allow for individual differences, the student should be permitted to use the fingers he considers most effective for dot perception. They do feel, however, that the student should be encouraged to use both hands, whenever possible, since this is the method employed by the best braille readers.

As stated earlier, the student is not introduced to the names of the various braille characters in any of the volumes in this manual. He is introduced to the dot numbers of the braille cell in Book III and continues practice in the identification of these numbers throughout Book IV. Obviously, the manual does not provide enough practice material for complete mastery in the identification of braille dots. It is intended as a reading readiness aid only and the exercises should serve as models from which the teacher can develop many more practical materials.

IMPLICATIONS FOR GUIDANCE COUNSELORS AND PRINCIPALS OF RESEARCH ON THE VOCATIONAL SUCCESS OF THE VISUALLY HANDICAPPED

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Energy, time, and financial resources expended on research are poorly invested unless some improvement in practice results. Too often relevant research findings are reported in obscure professional journals to which the average practitioner has limited access and hence the research has minimal impact on improving programs and services. It is with a great deal of pleasure and enthusiasm, therefore, that we share some of the results of our research efforts with a group of concerned professionals who, we hope, will translate findings into improved practice or at least begin to question and evaluate current practices. A final report for this project, funded by Social and Rehabilitation Services, is now available.* In this paper, we will discuss some of the more pertinent findings from this report as well as additional data collected during the project but not analyzed prior to the publication of the report.

As guidance counselors and principals we should be increasingly concerned with the evaluation of our secondary school programs. Such evaluations are often determined by studying the ultimate

*G. T. Scholl, M. K. Bauman, M. S. Crissey. A study of the vocational success of groups of the visually handicapped. SRS-RD-2554-s. Ann Arbor, Michigan: The University of Michigan, Project No. 02248-1-F, 1969.

adult adjustment of our pupils. The direction of needed change can frequently be identified as we look at characteristics of "successes" as compared with "non-successes" and as we ask ourselves questions which we may or may not be able to answer. It is primarily through such an exercise that we can evaluate realistically how well we are doing our job. The purpose of this paper is to review certain findings from our study that have special significance for educators working with visually handicapped adolescents and to raise some questions regarding certain aspects of educational practices and programs.

Relevant Findings from the Study

As is true with most research projects, more data were collected than were included in the report. In this section, we will review implications of some characteristics of the "successful" groups, discuss certain difficulties encountered in analyzing data from test results, and present data not included in the report related to mannerisms and intelligence.

Implications of Some Characteristics of the "Successful" Group

In general, we found that the successful subjects had better vision, higher levels of intelligence, were better educated, and spent the majority of their schools years in a single setting, with a greater percentage spending no time in the residential school. From my own years of experience in both teaching and administration in residential and day schools, I must admit (with regret) that we do tend to favor those pupils with better vision and with a higher level of intelligence because they are responsive to our methods and are easier to teach. It may be that we need to send those brighter pupils with better vision to regular public school programs earlier and concentrate our efforts on those who may be in greater need of our professional assistance and skill. At least we should give this alternative some consideration.

Further, since the less successful did tend toward greater movement between residential and day schools, perhaps we need to re-evaluate the strengths of a particular program in meeting educational needs and to make an early determination of the better program for each individual pupil. A greater degree of cooperation between the two types of programs may result in better education for visually handicapped pupils. When one setting

encounters a "challenging" problem, there is a tendency to shift the problem to the other setting, which may be just as poorly equipped to solve the problem. Again, I make this observation from my experience in teaching in both settings.

Let us turn now to some data not included in the report. For the Michigan sample, we compared males by educational level, i.e., those who had some further education beyond high school and those who completed the twelfth grade and under, on the best predictor variables for the criterion variables of percent of time worked, income, and socio-economic index (Scholl, 1969). We found that travel ability was a more important variable for the twelfth grade and under group than it was for those with further education beyond high school. The two groups did not differ significantly in travel ability but the twelfth grade and under group did have poorer vision. This may indicate that we do need to concentrate on the development of independent travel skills especially with the non-college bound since travel ability may be an important factor in their success.

We made another comparison that should be of interest to counselors. Using five categories of job success, as measured by percent of time worked, comparisons were made between the current job and vocational interests expressed by the subject while he was in high school and recommendations of the high school. Tables 1 and 2 report these data. Job success ranges from (1) highest percent to (5) lowest percent of time worked.

TABLE 1

Comparison of Present Job with
Subject's High School Interest
N = 103

Status Comparison:	Job Success				
	1	2	3	4	5
1 category higher	0	1	0	0	0
Same	23	17	10	15	8
1 category lower	2	4	1	6	7
2 categories lower	0	0	1	0	8

TABLE 2

Comparison of Present Job with
High School Recommendations
N = 102

Status Comparison:	Job Success				
	1	2	3	4	5
2 categories higher	0	1	1	0	0
1 category higher	2	1	1	1	3
Same	23	16	9	17	13
1 category lower	1	2	1	1	4
2 categories lower	0	0	0	0	5

It becomes clear that as subjects move from the most successful to the least successful, so do they, in their expressed interests, as well as their high school counselors in their recommendations, tend to make errors. It is also of interest to note that of the 103 subjects, one is currently employed in a job of higher status than his expressed interest in high school whereas 10 of 102 subjects are currently employed in jobs of higher status than their high school recommended. On the other hand 29 of the 103 subjects are employed in jobs of lower status than their interest in high school compared with 14 of 102 working in jobs of lower status than their high school recommended. Before generalizing about these data we should delve into other aspects. Suffice to say at this point, we should evaluate our counseling practices. We may be encouraging where we should be discouraging and vice versa.

Test Results

Except for measures of intelligence, results from tests administered during adolescence were not highly related to our three criterion variables for vocational success, namely, income from present or last job, percent of time worked, and socio-economic index of present or last job (Scholl, et.al., 1969, pp. 34-8; 188-205). Vocational interest tests were better predictor variables than were personality measures. It was not possible to utilize the results of the complete battery of tests with the subjects because of the variety of tests administered.

In the interview, we asked certain questions designed to tap the subject's view of himself compared with sighted persons and with visually handicapped persons (See Scholl, et.al., 1969, pp. 137-41). From these questions, we developed a rough measure of personal self-evaluation and social self-evaluation. Data from the Michigan subjects showed that this measure had a higher coefficient of correlation to the criterion variables than was obtained on any of the sub-tests of the personality measures employed with the total sample. It must of course be borne in mind that the measures were administered at different times in the subject's life. However, one may wonder whether employing a direct approach to comparing one's self to others may be a more productive measure than the more indirect paper-and-pencil personality test approach in the testing and evaluation process. This should be pursued with further research.

Measures of vocational aptitude were also utilized as predictor variables and showed very low relationships to the criterion variables. Data from the subjects were not analyzed comparing results from aptitude tests to current occupation, however. Such a comparison may yield more meaningful information about use of these tests. Additionally, it may be of value to explore more intensively the job-tryout or cooperative work experience pattern which was discussed during this conference. There is some research evidence that actual on-the-job exploration may be a better predictor for success than results of aptitude tests.

In summary, we might say that results from tests should be viewed as one valuable source of input in knowing about students but that they should not be the only resource. It was disappointing that few subjects volunteered information concerning test results when asked about the kind of counseling they had. It is possible that the counselor utilized test data during his work with a subject without the subject's awareness of this source of input. We would hope this was the situation rather than an alternative explanation that test data collected dust in a file drawer without being utilized by the counselor.

Relationship of Mannerisms to Vocational Success

One superintendent observed at an earlier meeting that he felt appearance was an important variable in determining successful employment. Utilizing data from the Michigan sample, one graduate student did find that the more successful subjects tended to

have fewer mannerisms (Sherwood, 1970). Those subjects with a single or no reported mannerisms tended to be among those employed for a greater percentage of time, more were found in the upper income levels, and more were employed in occupations with a higher socio-economic index.

When asked whether the blind had certain mannerisms that made them appear different than the sighted, all those with a single or one mannerism responded "yes" whereas 85% of those subjects with multiple mannerisms responded "yes". Further, more than half the subjects with multiple mannerisms thought they had no mannerisms. Interestingly enough, however, almost half the subjects with no mannerisms thought they had them. These findings lead one to wonder about the accuracy of the self-image of our blind students and whether we can supply them with an adequate mirror through which they can learn to evaluate their appearance realistically. As counselors, we may wish to give some thought to how an accurate self-image can be developed. This is related to the earlier observation from our unpublished data that the rough measure of self-concept, i.e., social self-evaluation and personal self-evaluation, were more directly related to job success than were so-called personality measures.

Relationship of Intelligence to Vocational Success

One of our doctoral students utilized data from the project to study the relationship of varying levels of intelligence to vocational success (Wilhelmi, 1970). His interest in mental retardation and in vocational rehabilitation motivated him to explore the possibility that blindness may change the definition of mental retardation as it relates to the blind retarded. More specifically, is it possible that a blind person with an I.Q. of 85-99 may be as handicapped or more handicapped that the borderline mental retardate with no other handicaps. In analyzing the data he did find, as expected, that both the mentally retarded blind (I.Q. below 85) and the hypothetically retarded blind (I.Q. 85-99) earned less, were in the lower socio-economic index group, and were employed a smaller percentage of time compared with the subjects with I.Q.s above 99. He also found that less money had been spent on them during the rehabilitation process. In comparing the blind retarded and the hypothetically blind retarded, he found no difference in percent of time worked but the hypothetically blind retarded earned more and had a higher

socio-economic index. The predictor variable that seemed most important for these groups seemed to be number of other disabilities.

With the influx of the rubellas and their multiple problems, we may need to re-evaluate our educational and rehabilitation programs in order to give them an adequate opportunity to become contributing members of society. This will require a greater expenditure of funds and counselor energy if we are going to reduce the impact of their disabilities on their potential for success.

Some Concluding Questions

All research findings must be interpreted against a background of current and future social, economic, and cultural conditions and trends. Many questions may be asked about school practices and educational programming in the light of our study. We would like to present three that seem to have special relevance. We can give you no answers either from research or from experience; our purpose is to provide you with some food for thought.

1. Is employment a feasible objective for our visually handicapped population, especially those who are retarded and those who have other disabilities, in the light of fewer jobs because of technological advances, increasingly restricted occupational range and particularly with their lower level of job success compared with the rest of society? If we answer "yes", then how can we improve their chances for success considering the variables discussed earlier? If we answer "no", what viable alternative do we offer them during secondary school years in order to help them feel useful and wanted in our culture?

2. Most secondary school programs in our public schools today are criticized for neglecting the non-college bound. What are we doing to improve and modify educational programs to meet the needs of this group? It would seem that opportunities to improve vocational education programs exist through increased federal funding for this purpose. What are we doing to take advantage of this opportunity? How creative are we being in exploring possibilities beyond the traditional type of jobs we have recommended for our students in the past?

3. In the not too distant future, our secondary programs will be filled with the rubellas who present multiple problems. What are we doing to prepare to meet their diverse and complicated needs?

4. What are we doing to improve our programs for pre-work evaluation? Are test results being utilized effectively in counseling? What about increasing our efforts for pre-work evaluation through on-the-job training, part-time employment for juniors and seniors, cooperative work study programs and other practices that may help our students enter the employment market?

The success of our efforts to seek answers to these questions and new directions for our programs will be measured in future studies of job success. Can we do a better job than we have in the past? The answer lies with each of us.

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PRESIDENT'S REPORT

William H. English, Principal

Virginia School for the Blind
Staunton, Virginia

For the past eight years it has been my very real privilege and pleasure to serve our organization as a member of the Board of Directors and as an officer. I was most fortunate in receiving this honor from you and hope that I have fulfilled the trust placed in me.

At our 1956 conference, Sam Ashcroft, when describing his activities as the first Director of Educational Research at the American Printing House for the Blind, so eloquently told the comparative story of the youngster who stubbed his toe on a small stone imbedded in the earth. When he attempted to dislodge the stone he discovered that in reality it was a huge boulder almost totally buried. This fable also well represents the tasks that face those who become directors of our association. It is almost impossible for us to realize the monumental tasks and responsibilities we have until one actually assumes the responsibility for their direction and operation.

Two years ago, in Toronto, our most obvious and pressing need was the securing of a new Executive Secretary and staff. We know that the selection of Mrs. Mary K. Bauman was a most fortunate choice. Under her stimulating and qualified leadership many changes have been brought about in our internal structure. It has been amazing to observe the total grasp she has of everything connected with AEVH and the administrative reorganization and "know how" that she has brought to the association office and activities.

As you know, our headquarters office was moved to Philadelphia in the spring of 1969. We now have very comfortable quarters there with a full complement of office staff. Miss Judith James serves as our Administrative Assistant and has become a most valuable

member of the team. Her concentration has been in the area of certification, membership, and preparation for this conference. I hope that each of you will have the opportunity to meet and talk with your office staff. In addition to Mrs. Bauman and Miss James, Miss Beverly Myers and Miss Carol Kropf are also here. The fact that they are all of the feminine gender does not mean that AEVH has formally joined the Women's Liberation Movement.

Prior to our formalized move to Philadelphia the Maryland School for the Blind most graciously provided us with a temporary home and assisted us in locating temporary staff. We are grateful to them for this very generous gesture.

One of the many and varied pleasures afforded me over the past two years has been the full cooperation by so many of our members in serving on committees. Great contributions have been made by many and to relate all of them would entail too long a time period for this brief meeting. However, I would like to mention a few.

The Certification Committee has almost completed revision of the AEVH certification requirements for teachers. This must, and will be, an on-going procedure throughout each biennium. This is the type of committee whose task is never completely finalized. It appears that certification will continue to be a vital service of AEVH for its membership. Many of you already find your salary scales tied to this certification.

In the area of Independent Living Skills, your committee has prepared and submitted to AEVH as complete a reference list as possible from all available North American sources. This reference list will shortly be made available to you through our office. With all programs serving visually handicapped youngsters now involved in such activities this reference list will soon become a vital tool for all concerned.

Because of the work done in previous years and the formation of the National Accreditation Council, following COMSTAC, our Standards Committee and I felt that there was very little need for their being a functioning committee. It will be my recommendation that this committee not be activated for the next biennium.

Though our financial picture is far from depicting an organization of wealth we do feel that we are in a stable position. Therefore, at the decision of your Board, I notified our Dues

Study Committee Chairman that there was no need for a re-structuring of our individual membership dues for the 1970-72 biennium. Though the price of chewing gum will soon become six cents, your AEVH membership fee will remain the same for at least two more years.

The legislative efforts, on the federal level, of AEVH have naturally been directed by the Legislative Committee. Both verbal and written support has been given to various pieces of legislation, perhaps most notably for the programs serving deaf-blind children in the regional centers.

Always we must be thinking of the future and the role of AEVH. This has been the assigned task of our Long-Range Planning Committee. Their report has been received and will be offered to your Directors for 1970-72.

Activity and involvement have and will continue to be the bywords of your association. In the planning or final preparation stages are several funded activities involving joint sponsorship with universities or sister agencies.

Just initiated last month is a year long project on planning for the actual researching of the various braille codes. Jointly sponsored by AEVH and AAWB, this activity was initiated through your Braille Authority and Braille Advisory Council. It is so designed as to culminate in an authentic piece of research work and will involve many people.

Hopefully, the next school year will see several strategically located short term institutes in Mobility Techniques and Practices for the young blind child and in the areas of personal and vocational guidance and counseling. These are planned for joint sponsorship with a number of universities. In some cases requests for funding have already been made and we are planning to submit the others as soon as possible.

The American Foundation for the Blind assisted us with the sponsorship, last spring, of two regional Careers Conferences for high school visually handicapped youth in Atlanta and Seattle. Approximately five hundred youngsters participated in this extremely valuable experience. Our relationships with AFB continue to be very close and further joint sponsorship of projects can be anticipated.

Our second regional conference, held last fall in Los Angeles, was an outstanding success. Further regional conferences are now being planned and it is hoped that their numbers will be expanded to multiple numbers within a year or so. The attendance of three hundred people in Los Angeles is indicative of the response that regional conferences can bring. The interest in them and the enthusiasm they generate is most contagious.

AEVH continues to have fine representation in other national and international affairs. We have been invited to and will participate in the 1970 White House Conference on Children and Youth. The CEC-ERIC Advisory Board maintains a position for an AEVH member and as usual we are represented in WCWB and ICEBY activities.

One project that has indirectly involved most of the total membership of AEVH during the past year is that with the Ladies Auxillary to the National Rural Letter Carriers Association. This has been an opportunity for United States members to tell their "story" throughout their respective states. Many projects throughout the states have resulted and many benefits have been received. In August, at their national convention, this fine group of ladies plan to make a sizeable cash contribution to AEVH. Until the actual presentation we will not know the exact amount but we can assure you that it will be wisely used for the sponsorship of still another AEVH activity.

Our Publications Board remains active. As you probably know it is their responsibility to develop policy regarding all association publications including whether or not a certain piece or set of materials will be published. The long awaited Library Manual was adopted and will be published as soon as possible. Under discussion now is a manual for teachers in the use and instruction of the Nemeth Code.

In the area of publications one extremely noticeable change has taken place within the last two years. That, of course, is the change in name and cover design of our professional journal, now called EDUCATION OF THE VISUALLY HANDICAPPED. The name change was necessitated by the change in our association's name and seemingly is much more appropriate. This professional publication, through the extremely diligent efforts of your two editors, is regarded as one of the leaders in professional educational publications. The FOUNTAINHEAD continues to be just what its name implies, a wealth of information for the classroom teacher

and administrator.

This and much more adds up to a busy and fruitful two years culminated by our biennial International Conference in which we now find ourselves involved. This program was keynoted last night by a most stimulating presentation. This will continue throughout the week as you work, discuss, listen, and perhaps, play a little. This is the fiftieth such conference, a golden anniversary. May you take away, as I will, golden memories of your activities here, those I have just discussed with you, and the knowledge that through full and active participation in your association you must become a better prepared teacher of visually handicapped children.

Again, I thank you for the opportunity to serve. I will continue to do anything I can to assist our association in fulfilling its purpose and obligations.

Thank you.

BRAILLE AUTHORITY REPORT 1970

The activities of the Braille Authority have been concentrated upon two primary projects during the past year: First, the continuation of the development of braille codes; Second, an analysis of the needs for research into existing braille usages and unexplored areas of code development.

The development, expansion and clarification of the codes for textbook format, mathematics, and computer symbology have now approached a plateau from which further progress can be made only through a broadened program of research. Specific improvements in the textbook format code were recommended for adoption in the 1969 report. The mathematics and computer codes are in the last stages of development and should be ready for presentation for adoption by the end of 1970. The Braille Authority and its Advisory Committees will have then laid the foundation for techniques and procedures vital to the effective presentations of a substantial portion of literary and technical braille reading matter.

Without a comprehensive program of research, the cut-off point for changes in braille codes appears at hand. To avoid continuous confusion in the field concerning the status of braille rules, it is recommended that only minor clarifications be offered until the projected research program has substantially finalized braille codes.

The Advisory Council to the Braille Authority has been actively proceeding with plans for the funding of a research project to encompass all components of braille codes and embossed representations. To furnish the Council with background information concerning the present status of braille codes and the specific areas requiring fundamental research, the views and recommendations of the experts and specialists serving on Advisory Committees were presented in writing for consideration.

On the basis of this material the Council has submitted an application for a planning grant to a federal agency for the purpose of seeking funding for a broad and concentrated program of research into each specialized area of braille representation in order that permanent standards can be established for comprehensive and effective braille systems.

Respectfully submitted,

Bernard M. Krebs, Chairman
AAWB-AEVH Braille Authority

AMENDMENTS TO THE CONSTITUTION AND BY-LAWS OF THE AEVH

The following changes in dues structure and amendments to the By-Laws and Constitution were made by the Conference, July 1, 1970:

That dues for School Corporate Members shall be $25.00 per year or .50 per student at that school, whichever is greater.

That dues for Associate Members shall be $5.00 per year.

Section 8 of the By-Laws shall read: The Executive Secretary must be bonded by a reputable surety company.

To Article VI - Amendments, of the Constitution, the following is added: Amendments must be submitted to the Board of Directors, at least four months prior to the business meeting at which the vote is to be taken. An amendment originating in one or more of the following manners will be placed before the Association for a decisive vote: (1) submission by the initiative of at least a quorum of Association members (eligible voting members from at least fifteen states or provinces, totaling at least one-twentieth of all eligible voting members of the Association); (2) submission by a majority vote of the total membership of the Board.

REPORT OF THE NOMINATING COMMITTEE

Margaret Polzien, Chairman

Michigan School for the Blind

The Nominating Committee submitted the following slate of candidates for office in the Association for Education of the Visually Handicapped for the 1970-72 Biennium:

OFFICERS

President
Mr. Carl J. Davis
Head, Department of Psychology and Guidance
Perkins School for the Blind

First Vice-President
Mr. Lee Jones
Superintendent, Georgia Academy for the Blind

Second Vice President
Mrs. Ferne Root Roberts
Teaching Resource Center
New York City

Secretary-Treasurer
Mr. Leland C. Sanborn
Superintendent, New York State School for the Blind

Immediate Past President
Mr. William H. English
Superintendent, Wisconsin School for the Blind

DIRECTORS

Mr. L. Robert Dodge
California

Dr. Verna Hart
Tennessee

Mr. Carl W. Lappin
Kentucky

Dr. Evelyn Rex
Illinois

Mr. Herbert J. Wolfe
Maryland

Following the second reading of this report on July 1, 1970, additional nominations were requested from the floor. None were made. Each of the above listed officers and directors was accepted and elected by acclamation.